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1988
Chapter10

NURSING

SIXTH REPORT TO THE PRESIDENT & CONGRESS

ON THE STATUS OF HEALTH PERSONNEL

IN THE UNITED STATES

June 1988

U.S. DEPARTMENT OF HEALTH & HUMAN SERVICES • Public Health Service • Health Resources and Services Administration

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- Monitoring developments affecting health facilities, especially those in rural areas.

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Division of Nursing

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FOREWORD

This report on Nursing is excerpted from the Sixth Report to the President and the Congress on the Status of Health Personnel in the United States, June, 1988. The Sixth Report is a continuation of a series of reports on health personnel assembled by the Secretary of Health and Human Services and submitted to the President and the Congress in response to the directives of several different sections of the Public Health Service Act. An Executive Summary of the report is included in this document.

This nursing report, which is Chapter 10 of the Sixth Report, presents and analyzes recent developments in the supply, geographic and specialty distribution, and education of the Nation's nursing personnel. It also provides an assessment of the supply and requirements of nursing personnel for the years 2010 and 2020.

Both this report and the full report on health professions may be purchased from the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161 (703-487-4650). Ordering information is as follows:

Full Report: Accession No. HRP 0907200

Nursing Report: Accession No. HRP 0907204

We are pleased to make this report available to you and hope you find it useful.

Jo Eleanor Elliott
Director
Division of Nursing

EXECUTIVE SUMMARY

The Sixth Report to the President and Congress continues a series of biennial reports on the status of the Nation's health care personnel submitted by the Secretary of Health and Human Services to the President and Congress in response to the directives of several different sections of the Public Health Service Act. As the sixth in a series of reports required by Section 708(d)(1) of the Public Health Service Act as amended by P.L. 94-484 and further amended by P.L. 95-623, it presents information on personnel in the professions of medicine (allopathic and osteopathic), dentistry, optometry, pharmacy, podiatric medicine and veterinary medicine.

This report also is the sixth in a series of reports on nursing supply, distribution, and requirements provided in response to Section 951 of P.L. 94-63 as amended by P.L. 95-623. It is the fifth in a series of mandated reports on public health personnel prepared in response to Section 794(c) of the Public Health Service Act as amended by P.L. 94-484 and P.L. 95-623. It is the third of this series of reports to respond to these directives through the synthesizing and combining of information for all health personnel into a single document.

Highlights from the report:

- Despite a recent drop in the number of persons applying to or enrolled in many health professions schools, the number of health care personnel continues to increase. Although the health professions have grown at varying rates, all have continued to exceed the growth rate of the U.S. population. During the period from 1980 through 1986 increases in the numbers of physicians, dentists, podiatrists, pharmacists, optometrists, veterinarians, and registered nurses have ranged from about 11 percent (for optometrists) to 33 percent for osteopathic physicians and have averaged about 21 percent for the large and diverse group of allied health occupations. The growth in the U.S. population during this period was 6 percent.

- Women constitute a large and growing component of the total workforce in the health services industry, reflecting the continuing predominance of women in nursing and in many allied health professions but also significant increases in the numbers of women in those health care professions where the practitioners have traditionally been predominately men. Since the early 1980s the number of women physicians, dentists, pharmacists, and veterinarians have increased by nearly one-third or more; in dentistry the number of women practitioners has more than doubled. By the beginning of the next century the rate of growth of women practitioners in these professions is expected to result in more than doubling their numbers and they are expected to represent from 16 percent to 42 percent of the practitioners in these professions.

- Practitioners from racial/ethnic minority groups continue to constitute a relatively small percentage of the workforce in most health professions. It is estimated that in 1985 Black practitioners constituted 3 percent of the total active supply of physicians, dentists, and pharmacists, in 1984 about 4 percent of the total registered nurse population was Black; in 1983, 13 percent of the licensed practical/vocational nurse population was Black. Hispanic personnel constituted about 3 percent of the physician supply, 2 percent of dentists and pharmacists, and 1 and 2 percent, respectively, of the RN and LPN population in those years. Analysis of the numbers of minority students training for careers in the health fields indicate that increasing the relatively small representation of Blacks, Hispanics, and American Indians in the health professions will present a continuing problem for the forseeable future.

- All States and most areas of the country have shared in the growth in the numbers of health care personnel. Furthermore, the growth rate of health care personnel has generally exceeded the growth rate of population, resulting in higher personnel-to-population ratios in most areas of the country. Although the increasing supply of physicians and other health care personnel appear to have alleviated some health care personnel distribution problems, many geographic areas appear to lack sufficient practitioners to assure adequate access to care. About 13 million persons or about 5 percent of the U.S. resident population remain underserved in the Nation's primary care health manpower shortage areas.

- Continued increases in the supply of health care personnel are expected to improve access for some areas. However, population and economic factors may remain unfavorable for the establishment of health care practices in many rural and urban poverty areas. Thus, such areas are likely to continue to remain short of adequate health care.

- In the 5-year period ending in 1986 the supply of primary care physicians has grown faster than all non-primary care physicians (15 percent compared with 10 percent). Each of the three primary care specialties has grown over this period. However, the number of physicians in general internal medicine and general pediatrics has grown at faster rates than the number of general/family practice physicians. The percentage of all MDs practicing in the primary care specialties has been approximately 33-34 percent during the 1980s.

- A number of recent developments in the health care industry have affected the settings in which health care services are delivered as well as the clinical, managerial, and technological skills required of health care personnel. Emphasis on health care cost containment, increases in the numbers of practitioners, changes in the methods of financing health care, entrepreneurial initiatives in service delivery (particularly among some allied health personnel), increased need for care and rehabilitation of

the elderly and technological advances along with growing use of highly sophisticated diagnostic and therapeutic equipment have all been influential in shaping the changes that are occurring in the health care delivery system.

- The traditional fee for service provided in private office-based practice continues to be the primary mode of practice for many practitioners, and hospitals are still the major employers of nurses and many allied health personnel. However, the growth in other than traditional care delivery systems has been notable in recent years. Greater emphasis on providing care in the most cost-effective setting has resulted in shifts to freestanding clinics, emergency centers, and hospital outpatient centers. Moreover, there has been considerable growth in the number and proportion of the population enrolled in health maintenance organizations (HMOs) and preferred provider organizations (PPOs) in recent years. The expansion of these alternative types of delivery systems is viewed also as a consequence of the growing numbers of health care providers in some fields and the rising and substantial costs of establishing private practices.

- Approximately 355,000 students were enrolled in schools/programs of medicine, dentistry, podiatric medicine, optometry, pharmacy, veterinary medicine, registered nursing and public health in academic year 1985-1986. Overall, the number of persons training for careers in these disciplines has declined somewhat since the early 1980s. Similarly, the number of persons applying to health professions schools also has declined considerably. This drop in applicants has been particularly rapid and steep in dentistry where there has been a decline of about 64 percent, dropping from a high of 15,734 in 1975-1976 to 5,724 in 1986-1987.

- Most health disciplines anticipate declines in the number of graduates at least through the mid-1990s. These declines will have virtually no demonstrable effect on the number of persons providing services in these fields through the end of this century. However, the declining number of graduates and the increased age levels of the practitioner pools are expected to contribute to a projected decrease in personnel in nursing by the year 2020 and in dentistry prior to the year 2010.

- Increases in health professions school tuition and other school expenses, coupled with the reduced availability of low cost alternatives to financing health professions education, appear to have contributed to a need for students to borrow more often in larger amounts and at higher interest rates than in the past. This results in a sizeable debt load at the time of graduation. The most recent data on indebtedness show that for 1986 graduates of schools of medicine, dentistry, optometry and podiatric medicine average indebtedness ranged from about $33,500 for medical students to about $58,000 for graduates of podiatric medical schools.

- With the aging of the population, geriatrics and gerontological issues have been given considerable attention in the training programs for health occupations. A number of fellowship programs are operational and continuing education programs for current faculty members and practitioners are being expanded. Although this gerontological emphasis has expanded substantially in recent years, most efforts are still relatively modest and are constrained by a shortage of faculty members with special preparation in teaching health care for the aging.

- Projections of the supply of health care personnel indicate that their number will continue to grow through the end of this century despite the expected declines in the number of graduates in the coming years. For most of these disciplines the projected growth in supply will occur at a slower rate than in previous years. These increases are expected to range from 9 percent for dentists to 80 percent for osteopathic physicians between 1986 and the year 2000.

- Although the supply of personnel in all fields is expected to be greater in the year 2020 than in 1986 (ranging from 2 percent higher for dentists to 177 percent higher for osteopathic physicians), by that time the effects of the declining number of graduates in the 1980s and 1990s will be evident. In several disciplines the growth in supply during the 2 decades from 2000 to 2020 is expected to average 1 percent or less annually. In dentistry and nursing, actual decreases in the supply are expected to be evident by the year 2020.

- The aggregate supply of most professions is expected to be in rough balance with requirements at least through the end of this century. (Readers should keep in mind, however, that there are many uncertainties associated with developing estimates of future supply and requirements and consequently, the figures presented in this report should be interpreted with caution.) Aggregate physician supply, on the other hand, is expected to exceed overall requirements. It is evident, too, that at the present time there is an increased demand for registered nurses in hospitals along with problems of recruitment and retention. While the other settings in which nurses are employed have not expressed their concerns in the way hospitals have, data have shown the chronic deficits in skilled nursing personnel in nursing homes. In addition, apparent distributional inbalances of registered nurses in local and geographical areas and in some selected specialty areas currently exist and may continue into the future. Although the aggregate supply of and requirements for nurses is expected to be in rough balance for the remainder of this century and the early years of the 21st century, by the second decade of the 21st century it is expected that requirements will exceed the supply available. The supply of baccalaureate and higher degree nurses is expected to fall short of the requirements throughout the projection period.

- A variety of strategies are under way within both the public and private sectors to better cope with the current concerns about the availability of a sufficient nurse supply. A Commission on Nursing has been appointed by the Secretary to develop recommendations leading to improved recruiting and retention of registered nurses in health care facilities throughout the Nation. The Commission will also evaluate and synthesize findings relevant to the development of a multi-year action plan implementing a private/public commitment for resolution of issues regarding the supply of registered nurses.

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Chapter 10

NURSING

Overview of Biennial Nursing Reports

This is the sixth report to the Congress in response to the statutory requirements in section 951 of Public Law 94-63 directing the Secretary of Health and Human Services to provide the Congress, on a continuing basis, detailed information on the supply and distribution of the requirements for nurses as well as on factors affecting supply and distribution. These data were to be used to determine the adequacy of the supply, from the standpoint of type and level of preparation, in relation to population needs and demands for nursing services. Section 951 further directed the Secretary to incorporate in reports to the Congress recommendations for legislation that would achieve an adequate supply and equitable distribution of nurses nationally and within each State. The annual reporting requirement in section 951 of P.L. 94-63 was subsequently amended by section 12(h), P.L. 95-623 (see copy, page 2) to require biennial reports.

Fulfilling the reporting requirements is a complex task. In terms of sheer volume, information must be collected and analyzed on the over 3 million nursing personnel who are employed in the health care system. Aggregate numbers are of less significance in determining adequacy of the nurse supply than are data on relatively small segments within the total supply. These data must be examined and analyzed separately. The over 3 million nursing personnel represent a range of competencies, from those with on-the-job training to those prepared for complex responsibilities in the management of patient care or the administration of nursing services. Moreover, they are distributed among a vast array of practice settings. Accordingly, a plan of action was developed to acquire and analyze data to meet the statutory requirement, which required the development of new tools for analyzing nursing resources and requirements by initiating projects that would integrate analysis of data collected in a number of different ways and through a number of different sources.

A series of reports was developed to comply with these requirements. The first of these, First Report to the Congress, February 1, 1977 (USDHEW, DN, 1977) relied, of necessity, on information that was already available, and it therefore dealt primarily with information on the supply and distribution of nursing personnel.

New models were developed for projecting requirements and making determinations of the anticipated nurse supply. The methodologies for both these requirements and supply models as well as the projections from these models are fully described in Second Report to the Congress, March 15, 1979 (Revised), Nurse Training Act of 1975 (USDHHS, DN, 1979).

Part D—Miscellaneous

Information respecting the supply and distribution of and requirements for nurses

Sec. 951. (a)(1) Using procedures developed in accordance with paragraph (3), the Secretary of Health, Education, and Welfare (hereinafter in this section referred to as the "Secretary") shall determine on a continuing basis— 42 USC 296 note.

(A) the supply (both current and projected and within the United States and within each State) of registered nurses, licensed practical and vocational nurses, nurse's aides, registered nurses with advanced training or graduate degrees, and nurse practitioners;

(B) the distribution, within the United States and within each State, of such nurses so as to determine (i) those areas of the United States which are oversupplied or undersupplied, or which have an adequate supply of such nurses in relation to the population of the area, and (ii) the demand for the services which such nurses provide; and

(C) the current and future requirements for such nurses, nationally and within each State.

(2) The Secretary shall survey and gather data, on a continuing basis, on— Survey.

(A) the number and distribution of nurses, by type of employment and location of practice;

(B) the number of nurses who are practicing full time and those who are employed part time, within the United States and within each State;

(C) the average rates of compensation for nurses, by type of practice and location of practice;

(D) the activity status of the total number of registered nurses within the United States and within each State;

(E) the number of nurses with advanced training or graduate degrees in nursing, by specialty, including nurse practitioners, nurse clinicians, nurse researchers, nurse educators, and nurse supervisors and administrators; and

(F) the number of registered nurses entering the United States annually from other nations, by country of nurse training and by immigrant status.

(3) Within six months of the date of the enactment of this Act, the Secretary shall develop procedures for determining (on both a current and projected basis) the supply and distribution of and requirements for nurses within the United States and within each State.

(b) Not later than February 1, 1977, and February 1 of each succeeding year, the Secretary shall report to the Congress— Report to Congress.

(1) his determinations under subsection (a)(1) and the data gathered under subsection (a)(2);

(2) an analysis of such determination and data; and

(3) recommendations for such legislation as the Secretary determines, based on such determinations and data, will achieve (A) an equitable distribution of nurses within the United States and within each State, and (B) adequate supplies of nurses within the United States and within each State.

(c) The Office of Management and Budget may review the Secretary's report under subsection (b) before its submission to the Congress, but the Office may not revise the report or delay its submission, and it may submit to the Congress its comments (and those of other departments or agencies of the Government) respecting such report. OMB review, submittal to Congress.

The general conclusion of the second report that supply and requirements would be roughly in balance by 1985 was tempered by the acknowledgment that maldistribution might continue to exist in certain areas of the country, in certain practice settings, and among nurses with certain specialized training. Through work experience and advanced training, nurses prepare for practice in various sectors of the diverse health care delivery system. For example, those whose skills equip them for specialized intensive care units are not likely to perform with equal effectiveness in community settings where assessment of health status and management of care are prime concerns.

In order to examine more closely these and other factors related to the adequacy of the nurse supply and to fill gaps in existing data sources, a national sample survey of registered nurses was conducted in September 1977 and the findings were reported in Nurse Supply, Distribution and Requirements. Third Report to the Congress: February 17, 1982 (DHHS, DN, 1982). In terms of the aggregate supply, the third report anticipated continued growth in the registered nurse supply over the next 20 years, although at varying rates.

Comparisons were made between the two sets of requirements projections and the four sets of supply projections based on alternative assumptions regarding the number and types of graduates that might be available. The comparison of supply projections in relation to the historical trend-based requirements projections indicated a reasonable balance between the two for 1990. By the year 2000, however, requirements projections exceeded supply estimates in three of the four series of supply projections. Comparison of the supply projections with the criteria-based requirements projections was made only for the year 1990. This comparison showed that requirements would outstrip supply with the most serious deficit occurring in the number of nurses with advanced training. Noting that Federal support had been an an important instrument in increasing the supply of registered nurses, the report urged States, the health care industry and the profession to assume a more prominent role in maintaining enrollments, subsidizing the costs of further increases, and instituting measures to improve the utilization of nursing personnel.

The fourth report to the Congress served the dual purposes of fulfilling the biennial reporting requirement and the congressional charge requiring the Secretary to report to the Congress on questions that had been the subject of a 2-year study conducted by the National Academy of Sciences acting through the Institute of Medicine (IOM). Questions addressed in this study, mandated by section 113, Nurse Training Amendments of 1979 (P.L. 96-76), were: to determine the need to continue a specific program of Federal financial support for nursing education; to determine the reasons nurses do not practice in medically underserved areas in order to develop recommendations for actions that could be taken to encourage nurses to practice in such areas; and to determine the rate at which and the reasons for which nurses leave the nursing profession and develop recommendations for actions that could be taken to encourage nurses to remain or reenter the nursing profession, including actions involving practice settings conducive to the retention of nurses.

Findings reported in the fourth report were in general agreement with those of the IOM study regarding the overall balance between supply and requirements for registered nurses in 1990 and 2000. For this reason the report recommended that the Federal Government limit its future role in maintaining the nurse supply to areas amenable only to Federal intervention or to areas in which Federal actions could serve as a catalyst to the non-Federal sector. These included continued support for the preparation of teachers, administrators and clinical specialists who constitute a scarce resource and are key elements in improving the quality of education, practice, and the management of nursing services nationwide. Extension of the existing authority for the training of nurse practitioners was also recommended as a means of augmenting the quality of care for population groups with limited access to primary health care services.

The fifth report (USDHHS, BHPr, 1986) drew basically from data collected in the 1980 Sample Survey of Registered Nurses (USDHHS, BHPr, 1982) and the 1983 Sample Survey of Licensed Practical/Vocational Nurses (USDHHS, DN, 1985) since findings from the ongoing 1984 Sample Survey of Registered Nurses (Moses, 1986) were not yet available for inclusion in the report. However, there was sufficient empirical evidence of the impact of change on the delivery on nursing services in institutional and community settings to support initial conclusions regarding the future needs in assuring an adequate supply of well-prepared nurses. The report noted that although the overall supply of nurses was expected to be in rough balance with demand in 1990 and 2000, the supply of nurses prepared at the baccalaureate and higher degree levels was expected to fall short of projected requirements.

The report called on the States, the health care industry, and the private sector to assume responsibility for using resources developed through 20 years of Federal assistance to assure a continuing supply of entrants into the profession and to rectify imbalances in geographic and specialty distribution. Federal intervention would continue to focus on stimulating the non-Federal sector to address national priorities such as increasing the representation of minorities and individuals from nontraditional backgrounds in the nursing work force. Further, enactment of the Nurse Education Amendments of 1985 recognized the critical need for nurses with specialized education in areas such as administration, primary care, geriatrics, home and community-based nursing, therefore, no further legislative action was recommended at that time.

Developments in the Registered and Licensed Practical/Vocational Nurse Supply

New Additions to the Nurse Population

Basic Nursing Education in the United States. Nursing personnel consist of three types of occupational groups: registered nurses, licensed practical/vocational nurses, and nursing aides. Formal educational programs preparing individuals for examination for licensure exist for the first two of these groups. Although some formal preparation may exist for segments of the nursing aide group, for the most part, they are on-the-job trained and are not licensed personnel.

Preparation to become a registered nurse may be obtained in a number of different settings. The programs in each setting vary in length and provide different degrees upon completion. The graduates from each, however, take the same licensing examination, which measures "minimum safe practice," and are licensed as registered nurses. According to the National League for Nursing, the source for annual data on the numbers of programs and students in nursing in the country, there were 1,473 nursing education programs preparing for registered nurse licensure as of October 15, 1985 (see table 10-1).

Until the beginning of the 1970s, diploma programs were the major entry route to becoming a registered nurse. However, their number has been steadily decreasing since that time. These programs are usually located in hospitals and are 3 years in length. Preliminary data from the National League for Nursing show that as of October 15, 1986, there were 238 diploma programs, 16 percent of total nursing programs.

The majority of nursing education programs are located in schools granting associate degrees. These programs, first established in the early 1950s, are located primarily in community colleges and are usually 2 years in length. As of October 15, 1986, there were 774 associate degree programs in this country.

Baccalaureate programs, the third major type of program preparing for registered nurse licensure, are most usually located in colleges and universities and require 4 years to earn the degree. The specific length of these programs varies according to whether the students are admitted at the freshman, sophomore, or junior year. About half of the baccalaureate programs admit students in the freshman year and the other half is about equally divided with students entering in the sophomore and junior years. As of October 15, 1986, there were 459 baccalaureate programs preparing students for registered nurse licensure.[1]

Admissions to basic nursing educational programs preparing for the registered nurse license showed sizeable increases since the early 1970s.

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[1]Included in the discussion of baccalaureate programs are entry level nursing programs leading to advanced degrees. As of October 15, 1985, there were four basic nursing programs leading to a master's degree in nursing and one basic program leading to a nursing doctorate as the first professional degree.

By the 1983-84 academic year, admissions totalled 123,824, a 58-percent increase over admissions in the 1970-71 academic year. Most of this growth took place in the early part of this period. In more recent years the annual admissions counts showed periods of both decline and growth. Since the 1984-85 academic year, the number of students admitted to basic nursing education programs annually have declined. Preliminary data for 1985-86 indicate that about 99,300 students were admitted to basic nursing education programs, a decline of 20 percent from the 123,800 in 1983-84.

By far, the largest proportion of the admissions, 55 percent, were in associate degree programs. Baccalaureate programs admitted 35 percent of the 1985-86 admissions while diploma programs had about 10 percent of these admissions. Diploma programs, unlike the other two types of programs that have shown significant increases in admissions since the early 1970s, have fairly consistently during that time frame shown decreasing numbers of admissions. The 10,245 students admitted to diploma programs in the 1985-86 academic year were only a little over a third of the number of annual admissions during the early 1970s.

Both the number of practical/vocational nursing programs and the admissions to these programs have decreased in recent years. Preliminary data from the National League for Nursing show that as of October 15, 1984, there were 1,254 State-Board approved programs in 1,162 schools (see table 10-2). Data available for the following year suggest that there has been a significant decline in the number of schools with practical nursing programs. Admissions during the 1984-85 academic year numbered about 47,000. This represents a decrease of about 24 percent since the 1982-83 academic year. Practical nursing programs are generally 12 months in length.[2] In the fall of 1984, 51 percent were located in adult vocational educational settings and 32 percent in community colleges. The remainder were distributed among secondary schools, hospitals, independent or government agencies, and a few, in senior college or university settings.

Cost of Nursing Education. The cost to the institutions for educating nursing students is not readily available. A major problem in studying the cost of nursing education is that such education does not take place in a free-standing school or department; thus certain components of the expenses are comingled with the expenses for other programs in the school. Additionally, nursing students take some of their courses in other programs in the school and the subsequent instructional costs are added to costs for nursing education.

In order to explore these costs more fully, the Division of Nursing, Bureau of Health Professions, entered into a contract with Arthur Young and Co. to develop a cost-estimating model for baccalaureate nursing educational programs. The report of the study describes a number of components that comprise the cost of preparing a generic baccalaureate student: direct costs for the nursing education department and for the instructional costs for those courses nursing students take in other departments in the school; and the indirect costs, including operation and

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[2]In California and Texas the licensing laws use the term vocational nurses to refer to these types of nurses. When the term "practical nurse" is used in this report it refers to both the practical and vocational nurses.

maintenance of the plant, institutional and academic support, student services, equipment and depreciation on the plant (USDHHS, DN, 1986). The model uses data from a number of data bases which provide details on the characteristics of colleges and universities and their cost components and information on nursing educational program characteristics and faculty, to develop estimates of what "typical" costs might be, given certain assumptions about the curricula studied.

Taking into account curricula, class, and school characteristics variations, the report contains an estimate that the average annual cost per full-time equivalent generic baccalaureate student in 1983-84, the last year for which there were data bases available for the study, was $8,150. About 45 percent of that cost was the direct cost for the nursing department component; 22 percent was for the direct cost of the credit hours taken in nonnursing departments, and a third was indirect costs.

Another aspect of costs for education of nursing students in which the Bureau is involved currently is that of studying the approved educational activities for nursing and other health professions for which hospitals receive reimbursement under Medicare. In line with the provisions of Section 9202(c)(1), P.L. 99-272, a study is being made of the types and numbers of programs and students for which hospitals are receiving such reimbursement; the fiscal and administrative relationships between the hospitals and the programs; and the types of expenses and benefits which accrue to the hospitals as a result of having such programs. The report of this study is due to be presented to the Congress on December 31, 1987.

A full examination of the costs of nursing education requires a review of student costs in addition to those of the school. While complete calculations of student costs (including the costs for housing, living expenses, foregone earnings, and tuition) have not been made, data are available on tuition costs for nursing programs. According to data reported by the National League for Nursing, the mean annual tuition for nursing students preparing for registered nurse licensure in publicly supported programs in their own State in academic year 1985-86 was $961. For students attending privately supported schools, it was $3,974.

Tuition varies, however, according to the type of program the student attends. In diploma schools (hospital-operated programs) the mean annual tuition in 1985-86 for a publicly supported program was $1,773 and for a privately supported program, $2,552. Most of the diploma programs (86 percent) were privately supported. In associate degree programs, which are mainly in publicly supported institutions (87 percent), the mean annual tuition was $781 in publicly supported schools and $4,025 in privately supported schools. Baccalaureate programs are about equally divided between publicly and privately supported schools. The mean annual tuition was $1,330 in the former and $5,257 in the latter. These figures on tuition costs exclude payments by students for laboratory and similar fees.

Comprehensive data are not available on support that individual students may have received to offset the costs of attending nursing programs. Through an interagency agreement with the Center for Education Statistics of the U.S. Department of Education, the Division of Nursing, Bureau of Health Professions, is participating in the 1987 Survey of 1985-86 College

Graduates in which data on such support will be obtained on graduates from baccalaureate nursing programs. It is anticipated that these data will be available during spring 1988.

Since 1964 Federal funds have been made available to schools of nursing for the purpose of providing loans to students. Recent modifications in the regulations have affected the availability of such loans. It is now stipulated that schools may not have more than a 5-percent dollar delinquency rate in their loans. Schools are encouraged to make diligent efforts to recapture loan payments made to students.

The Nurse Education Amendments of 1985 authorized the redistribution of loan funds returned to the Government from schools that withdrew from the program or had excesses of funds. More than $10 million in loan funds were redistributed to 188 nursing schools in fiscal 1987, 31 of which received loan funds for the first time. An estimated 10,000 nursing students will benefit from the use of the redistributed funds.

Students in Nursing Education Programs. Preliminary data from the National League for Nursing indicate that as of October 15, 1986, there were about 192,300 students enrolled in registered nurse programs. This is the third consecutive year in which the number of enrollees has shown a decline. Declines in enrollments were noted for all 3 types of programs since the 1983-84 academic year when both associate degree and baccalaureate programs had experienced increases in enrollments over the prior year. The number of students enrolled in diploma programs, except for some increase in the 1982-83 academic year, has consistently shown a decrease.

Data on the composition of the student body in registered nurse programs as of October 15, 1985 showed that about 5 percent of the enrollees were males. The proportion of male students varied little according to type of program. About 12 percent of the students came from minority backgrounds. Eight percent were Black, non-Hispanic, and 2.4 percent were from Hispanic backgrounds. Diploma programs were less likely to have minority enrollments than were associate degree or baccalaureate programs.

Enrollments in practical nursing programs have also declined. These programs reached the peak of their enrollments in recent years in the fall of 1982, at which time enrollments were 57,367. By fall 1985 there were 39,345 students enrolled in practical nursing programs, according to National League for Nursing data. Based on information available on the composition of the practical nursing student body as of October 15, 1985, 6.6 percent were men. A sizeable proportion of the students were from minority backgrounds, 21.4 percent. Fifteen percent were Black, non-Hispanic, and 4 percent were from Hispanic backgrounds.

Graduations from Nursing Education Programs. Reflecting increases that occurred in admissions during the early 1980s, graduations from registered nurse programs increased during 1983-84 and 1984-85 academic years. In 1984-85, the number of graduations reached an all-time high of 82,075. In 1985-86, however, the number of graduations declined to about 77,000. The decreases were noted in the associate degree and diploma programs only; baccalaureate programs still showed an increase. Given the recent declining enrollments, future graduation totals for baccalaureate programs

will undoubtedly show a decline as well. The majority of graduates are from associate degree programs. Baccalaureate graduates make up about 33 percent of the graduates and diploma graduates, about 14 percent.

Preliminary data on practical nursing graduates show about 37,000 such graduates in the 1984-85 academic year, a substantial decrease since the 1980s' high of 45,174 in 1982-83. Tables 10-3 and 10-4 show State distribution of admissions and graduations for nursing educational programs.

Issues in Licensure. As indicated earlier, there are two types of licenses covering nursing personnel in each of the States and the District of Columbia. Graduates of the programs described earlier most often take a national examination which is uniform from State to State. Those who are graduated from programs preparing for registered nurse licensure take an examination geared to measuring safe practice for that particular license, while those graduating from practical nursing programs take an examination which is developed for that licensed group. While licensure is a State responsibility, the use of a national examination and similarities among requirements of State Boards of Nursing enable nurses to move freely from one jurisdiction to another.

For more than 20 years, the nursing profession has debated the issue of professional vis a vis technical nursing practice and the level of education needed for each practice level. At issue is whether graduation from a program granting a baccalaureate degree should be the prerequisite qualification for professional practice, and graduation from an associate degree program qualification for technical practice. There are a number of questions to be dealt with in fully implementing this type of plan, including provisions for associate degree graduates who are already licensed as registered nurses. A few States have initiated plans toward implementing this approach to nursing licensure. However, in line with the current licensing procedures primarily in effect in the country, assumptions regarding nurse supply and requirements presented later in this report are mainly based on present licensure requirements.

Additions to the Nurse Population from Immigration of Foreign Nurses

Registered nurses who received their initial nursing education in a foreign country are not a significant proportion of the registered nurse population in this country. The 1984 National Sample Survey of Registered Nurses (Moses, 1986) estimated that about 4 percent, or 73,423 of the 1,887,697 registered nurses licensed to practice at that time, were graduates of schools in other than the 50 States or the District of Columbia.

A total count of registered nurse immigrants to this country is not available because occupational background data are not always given when individuals enter the country on visas unconnected to the occupational reference categories. However, from the annual counts available from the Immigration and Naturalization Service, it would appear that the annual count of registered nurse immigrants has decreased since the mid-1970s. However, the counts for the years following fiscal 1984 show an increase in the number of such immigrants. In FY 1986 there were 4,619 such immigrants, an increase of 27 percent over the number in FY 1984. As has

been typical over the years, the largest number of these come from Asia, particularly from the Philippines (see tables 10-5 and 10-6).

Not all the nurses who emigrate to this country can obtain a license to practice here. To gain licensure, these nurses are required to pass the State board licensing examination administered to all applicants for nurse licensure. The latest data available from the National Council of State Boards of Nursing show that in 1985, 40 percent of the foreign nurse graduates who were taking the examination for the first time passed, compared to 90 percent for United States graduates who were first-time takers. Among those who repeated the examination, foreign nurse graduates also did less well than the U.S. graduates. The passage rates were 13 percent and 52 percent, respectively.

Not all foreign nurse graduates taking the examination are newly arrived in this country; some make a first effort for licensure after living here for a period of time. Some make repeated attempts to pass the examination. A number of foreign nurses have been licensed at one time by a State based on endorsement of the foreign nurse license, but under current procedures, have later been required to take the examination because of changes in licensure requirements when they moved to another State.

Because of problems noted in foreign nurse graduates' ability to pass the licensing examination, the American Nurses' Association and the National League for Nursing sponsored the creation of the Commission on Graduates of Foreign Nursing Schools (COGFNS). The COGFNS administers an examination both here and abroad designed to test the nursing knowledge and English proficiency of the foreign nurse graduate. Successful completion of this examination is now required by the Immigration and Naturalization Service before a preferential H-1 nonimmigrant visa is granted. A labor certificate, issued by the Department of Labor, is also required to obtain an immigrant occupational preference visa. Many State Boards of Nursing have also established requirements for foreign nurses to have first passed the COGFNS examination before taking the State Board examination.

Not all foreign nurse graduates taking the State Board examination have also taken the COGFNS examination and, as indicated previously, foreign nurse graduates still have lower passage rates than do United States graduates. COGFNS has examined how those who passed the COGFNS examination fared on the State Board examination and found that these nurses had higher passage rates than did other foreign nurse graduates, although the rates were not as high as for U.S. graduates.

Characteristics of the Licensed Practical/Vocational Nurse Population

The latest available information on the licensed practical/vocational nurse population in this country comes from a 1983 sample survey of those with licenses to practice at that time (Jones, et al., 1984). In that study, conducted by Research Triangle Institute for the Division of Nursing, Bureau of Health Professions, it was estimated that there were 781,506 individuals with licenses to practice as practical nurses in the United States at that time. Among these, 24,500 were men and 140,800 were from racial/ethnic minority backgrounds. The Blacks (non-Hispanics)

among these nurses numbered 103,400 while Hispanics accounted for an estimated 18,700. The median age of the licensed practical nurse population was 38.6 years.

An estimated 37,440 of the 781,506 licensed practical nurses were also licensed as registered nurses. Therefore, almost 12 percent, or 28,640 of the 242,042 individuals who were licensed practical nurses but were not employed in that capacity, were working as registered nurses.

A total of 539,463, or 69 percent of those licensed to practice, were employed as practical nurses (see table 10-7). The following provides a summary of the employment status of the licensed practical nurse population in 1984:

	Estimated Number	Percent
Total with licenses to practice as LPNs	781,506	100.0
Employed as LPNs	539,463	69.0
Employed in other occupations	82,701	10.6
Licensed and employed as RNs	28,640	3.7
Employed in other health-related occupations	12,245	1.6
Employed in non-health related occupations	39,655	5.1
Type of employment not known	2,161	.3
Not employed	159,342	20.4

About 3 percent of all those with licenses to practice were actively seeking employment as a practical nurse, although some were employed in other occupations. Among those who were not employed at all, 55 percent had children at home and almost half were at least 50 years of age.

Characteristics of the Registered Nurse Population

In November 1984 the registered nurse population consisted of an estimated 1,887,697 individuals with current licenses to practice located in the United States (table 10-8) (Moses, 1986). The national sample survey, conducted by Westat, Inc. for the Division of Nursing, Bureau of Health Professions, obtained the latest comprehensive data on the registered nurse population in the country. The 1984 study is the third in a series of sample surveys made of registered nurses; the first was conducted in 1977 and the second, in 1980 (Roth et al., 1978 and USDHHS, BHPr, 1982). Since 1977, the registered nurse population has increased about 35 percent; between November 1980 and November 1984, it increased 13.6 percent.

Among the 1.9 million registered nurses in the population in November 1984, 3 percent, or an estimated 57,200, were men. The number of men in the population has more than doubled since the September 1977 study. An

estimated 155,390, or about 8 percent, of the 1.9 million registered nurses were from racial/ethnic minority backgrounds. While the proportion of nurses with minority backgrounds among the total population showed only slight change since 1980, the number of such nurses increased 30 percent. Since 1977, the number increased about 78 percent. The following shows the distribution of the registered nurse population in November 1984 according to racial/ethnic background:

	Estimated Number	Percent
Total registered nurse population	1,887,697	100.0
White (non-Hispanic)	1,705,393	90.3
Black (non-Hispanic)	74,024	3.9
Asian/Pacific Islander	49,173	2.6
American Indian/Alaskan Native	6,148	.3
Hispanic	26,045	1.4
Not known	26,914	1.4

The median age of the registered nurse population in November 1984 was 39.0, not much different than the median of 38.4 found in the November 1980 study. About 38 percent of the 1984 population had completed their basic nursing education in the 10-year period beginning in 1975 and almost a third had been graduated within the previous 15 years.

A number of registered nurses came into nursing after initial preparation for some other career. This trend was seen particularly among graduates from registered nurse programs in the 1980s. About 6 percent, or an estimated 117,500, registered nurses had received other post-high school degrees before they entered basic nursing education. Almost half of these had completed their nursing education in the 1980s. These nurses represented 14 percent of all those in the licensed population who had graduated from basic nursing educational programs in the 1980s. About 9 percent, or about 175,400 of the total population, had been or were licensed practical nurses. (Some of these were also part of the earlier mentioned group who had prior post-high school degrees.) A total of about 74,000 of those who had been practical nurses attended programs which prepared them to become registered nurses in the 1980s.

An estimated 1,485,725 of the 1.9 million registered nurse population in November 1984 were employed in registered nurse positions in nursing (see table 10-8). Since early 1977, the number employed has increased about 50 percent. Between 1980 and 1984, the increase was 16.7 percent. Thus, the relative increase in the numbers of those employed during the 1977-1984 time frame was greater than the relative increase in the total RN population. According to the study of the nurse population in November 1984, 78.7 percent of the registered nurse population was employed in nursing, as compared with about 70 percent in 1977, and an estimated 77 percent in 1980. The following shows the distribution of the registered nurse population of November 1984 according to its employment status:

	Estimated Number	Percent
Total with licenses to practice	1,887,697	100.0
Employed in nursing	1,485,725	78.7
Employed full time	984,330	52.1
Employed part time	501,091	26.6
Employed in other occupations	93,862	5.0
Health-related occupation	34,625	1.8
Non-health-related occupation	57,741	3.1
Type of employment not known	1,669	.1
Not employed	308,109	16.3

A total of 6,339 of the 93,862 nurses who were employed in other occupations were also actively seeking nursing positions at the time of the study and 29,424 of those who were not employed were looking for nursing positions. The 36,263 registered nurses who were looking for nursing positions represented 1.9 percent of the 1.9 million in the registered nurse population.

All together there were some 278,000 nurses who were not employed and were not seeking nursing employment. More than half (54.4 percent) of these individuals were at least 50 years old and 36.5 percent were 60 years or more in age. Among those who were under 50, 84 percent were married with children at home.

Geographic Distribution of Registered Nurses

The ratio of nurses to the population is used to examine the distribution pattern of nurses in various areas of the country because of the large differences in population sizes. Although these ratios are used for comparison purposes, they are not a true measure of the nursing services provided to the population. The concentration of nurses in a particular area is dependent in part on the concentration of facilities or organized service settings in which they can practice. Therefore, an appropriate evaluation of differences in services provided should take into account available facilities as well as nurses.

As shown in table 10-8, the November 1984 Sample Survey of Registered Nurses showed a range in the ratios of employed nurses per 100,000 population from 389 in Louisiana to 1,096 in Massachusetts and 1,519 in the District of Columbia. Every jurisdiction increased its nurse/population ratio between 1977 and 1980 and all but three increased it between 1980 and 1984. In the States that did not show an increase--Connecticut, Kentucky and Minnesota--the estimated employed nurses in each of those survey years was about the same in both years, Connecticut's nurse/population ratio was similar but both Kentucky and Minnesota showed a decrease between the 2 years. In general, the highest nurse/population ratios were in the northeastern section of the country and the lowest in the south central, although the south central part of the country had the largest increase in the number of employed nurses during the course of the three surveys.

Variation from State to State and in each part of the country can also be noted in the proportion of the overall registered nurse population that is employed in nursing. Variation can also be seen between the urban and non-urban areas of the country in the following data from the 1984 National Sample Survey showing the percent of the nurse population in each area that is employed in nursing:

	Total	Metropolitan areas	Nonmetropolitan areas
United States	78.7	79.6	74.8
New England	75.9	77.9	69.9
Middle Atlantic	75.4	76.7	67.5
South Atlantic	78.6	79.3	75.4
East South Central	84.7	86.0	81.3
West South Central	77.9	78.7	74.4
East North Central	80.3	81.4	75.1
West North Central	84.2	86.3	79.9
Mountain	76.0	75.9	76.6
Pacific	79.4	79.6	77.5

In the Mountain area, the one area where nurses in the nonmetropolitan areas had a higher activity rate than those in the metropolitan areas, about 29 percent of the nurses were located in nonmetropolitan areas. In the country as a whole, about 18 percent of the employed nurses were located in nonmetropolitan areas. The West North Central had the highest proportion of its nurse population and its employed nurses in nonmetropolitan areas, 34 percent and 32 percent, respectively. The areas of the country where the highest proportions of the registered nurse population were employed in nursing, the East South Central and the West North Central, were also areas where the nurses were more likely to come from the younger segment of the nurse population.

The number of registered nurses located in a State is not only a function of how many nurses may have graduated from educational programs in the State but also the number who may have migrated in or out of that State. The 1984 Sample Survey estimated that about 4 percent, or 75,000, had relocated to another State or a foreign country between 1983 and 1984. Younger nurses were most likely to change their residence; three-quarters of those who relocated were under the age of 40. About a third, or an estimated 637,000 of the 1.9 million in the 1984 registered nurse population, were either employed, or if not employed, were residing in a State different from the one in which they had taken their basic nursing education.

The effects of the types of area health facilities on the concentration and distribution of employed registered nurses can be seen from some examples of employment setting distributions of nurses in different areas of the country. Although a sizeable majority of registered nurses were employed in hospitals throughout the country in all areas, because of the concentration of the largest, more complex hospitals in metropolitan areas, 69 percent of the metropolitan area-employed registered nurses were

working in hospital settings compared to about 62 percent of those employed in nonmetropolitan areas. On the other hand, 10 percent of the nonmetropolitan area nurses were working in nursing homes compared to 7 percent of the metropolitan area nurses. Public/community health nursing was a relatively more important employment setting for nonmetropolitan area nurses than for metropolitan area nurses. Ten percent of the nonmetropolitan area nurses and 6 percent of the metropolitan area nurses were in public health settings.

Larger distributional variation was found for registered nurses than for licensed practical nurses, as the data from the 1983 National Sample Survey of Licensed Practical/Vocational Nurses show in table 10-7. Employed licensed practical nurses per 100,000 population ranged from 119 in Alaska to 384 in Ohio. The Mountain area had the lowest ratio, 173, and the Pacific area the next lowest, 176. The West North Central with 280 per 100,000 population and the East South Central with 278 had the highest ratios. Practical nurses were more likely to be located in nonmetropolitan areas than were the registered nurses or the population as a whole. About 32 percent, or 251,000, of the 781,500 licensed practical nurse population were in nonmetropolitan areas. About 19 percent of the registered nurse population and about one-quarter of the total country's population were located in nonmetropolitan areas.

Educational Preparation of Registered Nurses

Educational Background of the Registered Nurse Population. The proportion of the total registered nurse population receiving initial nursing education in a diploma program has declined considerably since the initial sample survey was conducted in 1977. In that year, it was estimated that 75 percent of the 1.4 million registered nurse population at that time came from diploma programs. By November 1984, only 54 percent of the 1.9 million registered nurse population came from diploma programs. An increasing proportion of all registered nurses are being prepared in associate degree programs as the following summary of the basic nursing education of the registered nurse population shows:

	1977		1980		1984	
	Number	Pct.	Number	Pct.	Number	Pct.
Total	1,401,633	100.0	1,662,382	100.0	1,887,697	100.0
Diploma	1,049,002	74.8	1,050,661	63.2	1,020,916	54.1
Associate degree	158,530	11.3	308,616	18.6	466,969	24.7
Baccalaureate	191,494	13.6	287,993	17.3	384,989	20.4
Master's	(Not available)		1,593	.1	2,705	.1
Not known	2,607	.2	13,520	.8	12,116	.6

The education of registered nurses in the basic program preparing them for licensure constitutes the foundation for their practice. Once licensed, many nurses obtain additional education, either in formal academic programs providing preparation for advanced clinical, administrative, or teaching positions, or in continuing education programs providing preparation for specialized skills or new techniques.

About 16 percent of the 1984 registered nurse population, an estimated 305,000, had earned additional degrees since they completed their basic nursing education. This included about 18 percent of diploma graduates, 16 percent of baccalaureate graduates, and 12 percent of associate degree graduates.

Taking all nursing-related education into account, both the basic nursing education and that taken after becoming a registered nurse, the highest educational distribution for the registered nurse population as of November 1984 was as follows:

	Number	Percent
Total	1,887,697	100.0
Diploma	855,368	45.3
Associate degree	429,941	22.8
Baccalaureate	480,743	25.5
Master's	105,585	5.6
Doctorate	5,650	.3
Not known	10,409	.6

This distribution from the 1984 study is markedly different from that found in the 1977 study; however, it is not surprising, given the changing nature of the nursing education system and the somewhat higher propensity among nurses at the time of the 1984 survey to have obtained higher degrees than was the case when the 1977 study was made. In 1977, about 67 percent had a diploma as their highest educational level; only 11 percent, an associate degree, and 17.5 percent, a baccalaureate. The number of nurses with master's degrees almost doubled within the time period, from 55,000 to 106,000. In 1977 an estimated 2,300 nurses held doctoral degrees.

Not only has there been an increase in the number of nurses with higher level degrees but also there has been some shift in the primary focus of such degrees. In the 1977 study, about 41 percent of nurses with a master's or doctorate had education as a primary focus of their study, and 32.5 percent had the clinical practice area. As can be seen in the distribution below, in 1984 about 46 percent had clinical practice as the primary focus of their degree:

	Number	Percent
Total RNs with master's or doctorates	109,011*	100.0
Education	29,552	27.1
Supervision/administration	21,958	20.1
Clinical practice	50,485	46.4
Community/public health	6,295	5.8
Maternal/child	11,309	10.4
Midwifery	1,534	1.4

(continued)

	Number	Percent
Geriatric/gerontology	1,068	1.0
Medical/surgical	11,204	10.3
Psychiatric/mental health	12,443	11.4
Other clinical practice	6,576	6.0
Specialty unknown	56	.1
Research	1,012	.9
Other	4,072	3.7
Not known	1,932	1.8

* Excludes those whose highest degree was a master's received in their basic nursing education program.

Based on the data from the respondents to the 1984 study, it was estimated that about 182,000 registered nurses were enrolled in formal educational programs leading to a nursing or nursing-related degree.[3] About two-thirds were estimated to be enrolled in programs granting the baccalaureate degree and about 8 out of 10 of all the enrollees were estimated to be attending school on a part-time basis. Most of the enrollees were also employed in nursing, most likely on a full-time basis. Thus, as indicated by the study data, financial support for schooling was most likely to come from personal resources, such as savings, earnings, and spouse's earnings. About 41 percent of students received some support from employee tuition plans. This area of support has increased in use since the 1980 study when 31 percent received such support.

While Federal sources of student support were not very prevalent on an overall basis, they had more prominence for those at the master's or doctoral levels. About 9 percent of master's students and 15 percent of doctoral students used Federal traineeships, scholarships or grants as a financial support source, and 5 percent of master's students and 10 percent of doctoral students used federally assisted loans. Also, about 9 percent of doctoral students had financial support from university teaching or research fellowships.

Programs Providing Advanced Nursing Preparation. Graduate programs in nursing provide a necessary ingredient to the expert and efficient delivery of nursing care in the country. These programs produce the new leaders, teachers, and clinicians with advanced skills. These individuals function in a variety of ways--in administration, teaching, research, and the provision of expert care--to provide the management structure and the guidance necessary to the sound practice of nursing throughout the health care system. Annual data from the National League for Nursing show that master's degree education for nurses has expanded considerably during the

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[3]Since this count far exceeds the number of enrollees in post-RN baccalaureate, master's and doctoral programs identified as nursing programs, it is assumed that a number of these individuals are either in programs which are nursing-related but have not been specifically identified as nursing programs or are taking courses in degree-granting programs but are not formally registered for the degree.

last two decades. The number of master's degree programs has more than doubled since the early 1970s. As of fall 1985, there were 167 master's programs in the country (NLN, 1987). Currently, all States except Vermont have at least one master's degree program, whereas in the fall of 1975, there were 10 States that had no such programs.

Along with the expansion in the number of programs, there has been a sizeable increase in the number of students enrolled in nursing master's degree programs due to both the increase in the number of programs and an increase in the average enrollments per program. However, in the latter part of the 1970s and in the 1980s, average enrollments have stabilized. The proportion of enrollments comprising full-time students has continued to decline throughout this period so that the number of graduations per year in the 1980s showed little change from year to year, as can be seen in the following data:

	Enrollments		
	Number	Percent	Graduations
1970-71	4,765	74.1	2,082
1972-73	6,342	68.2	2,430
1974-75	7,924	56.3	2,678
1976-77	10,809	54.8	3,800
1978-79	13,105	50.1	4,596
1980-81	15,053	48.5	4,998
1981-82	16,125	43.4	5,149
1982-83	17,085	37.4	5,039
1983-84	18,112	35.8	5,082
1984-85	19,401	35.0	5,247

Along with the increased availability of master's degree programs, there have been changes in the functional areas of study emphasis. In 1970-71 the majority of graduates specialized in teaching or administrative management with about 40 percent of total graduates specializing in teaching. By the 1972-73 academic year, the majority of graduates had clinical practice as their functional area of study, and by 1984-85, the figure was 69 percent.

Historically, nurses were prepared for leadership positions at the baccalaureate level. When the great majority of nurses were diploma-prepared, the nurse with a college education was relatively rare and was the individual best suited to be a role model and to provide leadership in areas such as teaching, administration, and advanced clinical practice. With the rapid increase in scientific and biomedical knowledge, nursing education began to move more deliberately into academic settings, which could better provide the kind of education nurses needed to work in the modern health care environment. In an era that requires four collegiate years to prepare a nurse who can function as a generalist in a variety of settings, preparation for leadership has, of necessity, become a function of graduate level education. Further, the depth and scope of knowledge required of the nurse leader calls for specialization at the advanced level, in one of a number of clinical specialties, or in one of the more "functional" areas such as nursing education or administration of nursing services.

During the 1960's there was a strong trend to develop master's programs that focused on the preparation of nurses as clinical specialists in a particular field, such as medical-surgical nursing, maternal-child health nursing, or psychiatric-mental health nursing. Graduates of these programs were prepared to act as change agents who would move into clinical settings to serve as role models working primarily with nurses less prepared to improve the quality of nursing care provided. Since that time, programs designed to prepare nurses for this clinical specialist role have become the predominate type of nursing program and large numbers of nurses have moved from these educational programs into the work setting.

By the mid-1970's, however, it became clear that, in their urgency to develop skilled clinicians, schools of nursing had rather consistently withdrawn resources from programs designed to prepare nurse educators and nurse administrators. This has not proved as difficult a problem for nursing education as it has for nursing administration. As nursing education moved more into colleges and universities, the academic credentials necessary for tenure have been sought by faculty desiring employment in those settings. Further, there is a general consensus that, since the teacher must first know content which can be taught, the master's degree in a clinical specialty area is an essential goal. Beyond that, the teacher of nursing needs additional education that maximizes the individual's ability to function in the role of educator.

Increasing the capability of schools of nursing to produce skilled nurse administrators has been more difficult. In the late 1970s, the Federal Government recognized the need for more programs in nursing administration and supported the development of three doctoral programs in this field. The success of these programs and the Federal Government's interest in supporting programs in nursing administration resulted in the submission of a larger number of grant applications in this specialty area.

Other schools used non-Federal funds to establish programs to prepare nurse administrators. Currently, there is a significant number of schools to which nurses may look for advanced preparation in this area. Nurses may be prepared as middle- or executive-level managers. As the health care industry becomes more complex and experiences growing economic constraints, financial management and ethical decision-making content have become integrated in these programs. A school may prepare only middle-level managers, in which case the student also develops clinical expertise to assist in the management of clinical environments, or it may focus on the preparation of executive-level administrators, providing its graduates with other tools to assist them in the management of large and complex organizations.

Overall, there has been real growth in the number of master's and doctoral programs in nursing since enactment of the 1975 law which introduced legislation specifically targeted to graduate education. These programs have consistently been responsive to societal need and have supported programming in specialty areas such as the nursing care of the aged, of the mother and child, and of the chronically ill. Increasingly,

programs have been developed that focus on the provision of primary care in the home and in the community. Programs in community health nursing, home health care and occupational health have targeted population groups which can best benefit from approaches that incorporate health promotion and disease prevention principles. As the cost of providing health care escalates, the value of providing a wider scope of nursing care to individuals in their homes and communities has become clear. Primary care practice has become an area of specialization in its own right, and both programs which prepare for essentially primary care practice and programs that incorporate principles of this kind of practice are widely found today.

It is interesting to note that master's programs have undergone changes in form as well as in content. Programs are commonly found which are designed to accommodate the part-time student. Coursework is offered in the evening, on weekends or in summer only sessions. This flexibility is important to the nurse who must remain employed while seeking advanced preparation. In addition, with the advent of doctoral programs in nursing, the master's degree is often no longer the terminal degree. Nursing faculties are designing master's programs that will both fill the need of the nurse who will not continue beyond this first advanced degree and those who will.

Like master's programs, doctoral programs have increased in number. In the fall of 1970, six programs had students enrolled. In 1987, more than 40 programs are known to the Federal Government to have admitted students. As would be expected, the number of student enrollments and graduations have also increased. Enrollments totaling about 500 in the mid-1970s had increased to 1,788 in the fall of 1985. Graduations, which tend not to increase at the same rate since so many students must study part time at this level had, nevertheless, increased from 62 in the 1975-76 academic year to 198 during the last year for which figures are available, 1984-85.

Prior to 1962, nurses sought doctoral preparation in disciplines other than nursing and, most often, achieved the Ed.D. degree which appropriately prepared them for positions of responsibility in schools of nursing. Some of these nurses, however, sought degrees in the social or biomedical sciences and, entered programs of study which stressed research as a basic element of the discipline. These nurses began to employ research methodologies as a working tool in their own discipline, and the potential and value of research in nursing quickly became apparent. When schools of nursing began to develop their own doctoral programs, the Ed.D. model was almost universally rejected in favor of the research model, and the Ph.D. degree became the most frequently offered degree. Some schools developed doctoral programs that focused on the clinical aspects of nursing and were envisioned as preparing experts in clinical practice. These schools offered the Doctor of Nursing Science Degree (D.N.S.).

Today, the nurse seeking doctoral preparation in a school of nursing may choose either the Ph.D. or D.N.S. program. Doctoral programs in nursing are limited in number and these programs tend to admit small numbers of students in order to insure quality education and a favorable student/faculty ratio. A significant number of nurses still seek doctoral preparation in fields other than nursing.

Doctoral programs that focus on nursing build on the specialized base that students have attained at the master's degree level to develop nurse experts in clinical research and nursing science. Graduates are prepared for advanced practice, to conduct nursing research, to teach in collegiate nursing programs, or to administer complex nursing services. Although a number of doctoral programs now offer such preparation, it will take considerable time for them to build their capacities to prepare larger numbers of quality graduates who will be able to make significant contributions to teaching and to research (IOM, 1983, p. 137). It appears that the capability of most schools of nursing to develop doctoral programs was significantly assisted by support from the Federal Government during their developmental phases.

In 1984 the Division of Nursing supported a national conference which focused on doctoral programs in nursing and on the development of quality indicators for these programs. The primary areas of concern were: issues of quality in doctoral programs in nursing, definition of areas in the newly developing doctoral programs in which quality control is critical, development of statements of criteria for assessing quality, and the identification of resources and extra-university relationships crucial to the operation of these programs. The participants identified 45 indicators of quality for such areas as faculty, programs of study, resources, students, and program evaluation. The report of these efforts has been influential in assisting schools to evaluate their existing programs and develop new programs (AACN, 1984). In addition, it serves as a resource for nurses seeking doctoral education.

The 1983 Institute of Medicine study of nursing and nursing education included a recommendation that graduate nursing programs be expanded to assist in increasing the rate of growth in the number of nurses with master's and doctoral degrees in nursing. It further cautioned that Federal support for doctoral programs should be targeted primarily to strengthening existing programs, rather than encouraging development of new programs which might not have strong resources.

The Nursing Work Force

Summary of Current Developments in Practice Settings

Nursing practice and the settings in which it is carried out are undergoing change as the population of the country and the delivery system are requiring different care emphases and different practice modes. While it is beyond the scope of this report to present an in-depth analysis of these changes, it is important to an understanding of the character and location of the nursing work force to present a summary of these changes.

One of the most significant population changes in the country having an impact on both nursing practice and practice settings is the aging of the population. The proportion of the population that is 65 years or older continues to grow along with the life expectancy at birth. As of July 1, 1985, there were 28.5 million people in the country at least 65 years old. This represents an increase of 11 percent in this age group between 1980

and 1985, at a time when the total population increased about 5 percent. The number of persons who were 85 years old and over showed an even higher growth rate. Between 1980 and 1985, there was a 19-percent increase in the number of these individuals. The average life expectancy at birth in 1984 was 74.7 years. For persons who were 65 years old in 1984, the average remaining life expectancy was 14.5 for men and 18.7 years for women (U.S. Bureau of the Census, 1987).

It is anticipated that various segments of the population may be healthier due to increased emphasis on wellness and disease prevention. On the other hand, increased advances in science that save more high-risk newborns and people with certain types of disease processes, could result in increased numbers of individuals with chronic problems. While the scientific advances may decrease health care needs, they increase the technological skills and care needs required of the nurse.

The continuing emphasis on controlling the costs of and expenditures for health care have led to substantial changes in the approaches to the delivery of care. There has been a decline in the number of admissions to hospitals, with the rate of the decline accelerating in 1984 and 1985 after the advent of the prospective payment system for payment of hospital care under Medicare. Concurrently, there has been a decline in the length of stay of hospital patients. Although the rate of decline of admissions has decreased and the average length of stay has stablized, these trends have had major implications for the type of patients cared for in hospitals. Hospital patients tend to be sicker than in the past since, increasingly, only those in need of the complex care that requires institutionalization are being admitted. Also, patients are sicker at discharge. It is no longer unusual for patients needing home care to require highly specialized care. Not only is there increased need for home care but community health nurses are now taking care of clients on respirators, dialysis machines and hyperalimentation. Home care nurses are now providing a level of care that was previously only found in hospitals.

Associated with the shift to out-of-hospital care is the corresponding increase in ambulatory care services and the development of new types of care delivery centers, such as ambulatory surgery centers and emergency care centers. The expansion of the use of health maintenance organizations (HMOs) and preferred provider organizations (PPOs) as a means of obtaining health care has implications for the requirements for nursing personnel and the role of such personnel.

In addition to the changes taking place in the hospital setting and in the community or ambulatory care settings, nursing homes are also affected by both the aging of the population and the shifts in the focus for the delivery of health care. Residents in nursing homes are older and sicker, requiring more assistance at many levels of care.

As shown in tables 10-10 and 10-11, the overwhelming majority of nursing personnel are employed in institutional settings. The November 1984 National Sample Survey of Registered Nurses showed that three-quarters of the employed registered nurses were working in hospitals, nursing homes or extended care facilities (Moses, 1986). Similarly, about 80 percent of the

employed licensed practical nurses were working in such settings in November 1983 (Jones, et al., 1984). While no overall counts of ancillary nursing personnel are available, their major employment setting is either hospitals or nursing homes, although there is increasing use of such personnel as home health aides.

Hospitals. As in the past, hospitals continue to be the leading employer of nursing personnel in the country when compared to all other health care settings. A total of 1,573,465 nursing personnel were employed in hospitals in 1985, the latest year for which there are counts of hospital personnel (see table 10-12). These individuals represented 38 percent of the 4.1 million total personnel employed in hospitals. Registered nurses were 60 percent of the nursing personnel employed in hospitals, licensed practical/vocational nurses were 16 percent, and ancillary personnel (nursing aides, orderlies, attendants, operating room technicians, and others) were 24 percent.

More than three-quarters of hospital nursing personnel were employed in community hospitals (non-Federal, short-term general and other special hospitals whose facilities and other services are available to the public). Community hospitals employed 91 percent of registered nurses in hospitals, 88 percent of the licensed practical nurses, and 71 percent of the ancillary personnel. Community hospitals continue to be more likely than other types of hospitals to employ licensed practical nurses (see table 10-13).

From 1981 to 1985, there was relatively little change in the total employees in community hospitals. The budgeted vacancy rate declined from 4.2 percent in 1981 to 3 percent in 1983, then rose slightly to 3.3 in 1984; data, however, are not available for 1985. The vacancy rate in 1984 for registered nurses rose slightly, by 0.2 percent; for licensed practical nurses, it rose by 0.5 percent; and for ancillary personnel, by 0.6 percent. The vacancy rate for registered nurses was greater than that for all hospital personnel.

A survey of 2,300 hospitals was carried out by the American Organization of Nurse Executives of the American Hospital Association in December 1986 to examine the supply of nursing personnel in hospitals. The results, based on responses from 44 percent of the hospitals, show that approximately 13.6 percent of registered nurse full-time equivalent positions were vacant. The study also showed that 17.6 percent of the reporting hospitals had no vacancies. In the Middle Atlantic region, 4 percent of hospitals reported no vacancies, while in the West North Central region 32 percent reported no vacancies. Hospital size was also a factor, in that the larger hospitals reported the highest percentages of vacancies (AHA, 1987).

The number of registered nurses employed in community hospitals rose by more than 100,000 from 1981 to 1985 to a total of 851,827, a 13-percent increase. In contrast, the number of licensed practical nurses declined by 19 percent to 221,987, and ancillary nursing personnel declined by 16 percent to 272,827. In addition, the number of community hospital full-time equivalent positions per 100 adjusted average daily census for registered nurses in 1985 was 87, considerably higher than the 73 full-time

equivalent positions for registered nurses in 1981. The ratio for licensed practical nurses declined from 27 in 1981 to 23 in 1985, and from 32 to 29 for ancillary personnel for the same time period.

Some additional insight into the employment characteristics of nursing personnel in community hospitals can be gained from the AHA Hospital Nursing Personnel Surveys for 1983, 1984 and 1985 when data from hospitals reporting for each of the 3 years were examined.[4] The approximate composition of the budgeted nursing staff positions (employed plus vacancies) changed from 1983 to 1985 as shown:

	1983	1985
Registered nurse	58%	68%
Licensed practical/vocational nurse	21%	17%
Aide	21%	15%

The total budgeted nursing staff positions decreased approximately 13 percent with registered nurses increasing about 1 percent and licensed practical nurses and aides decreasing 28 percent and 39 percent, respectively, which indicates a trend toward a higher concentration of RN staff and lesser utilization of both LP/VNs and aides.

Vacancy rate estimates from the hospitals reporting for each of the 3 AHA survey years show no clear pattern for the survey years, in that 1985 rates are higher than those for 1984, but those of 1984 are less than those estimated for 1983. The vacancy rate for RNs and LP/VNs in 1985 are less than 0.5 percent higher than in 1983--slightly over 5 percent and under 3 percent, respectively. The vacancy rate for aides remained under 3 percent for all 3 years.

The turnover rates of nursing personnel in these hospitals, as estimated over the third quarter of each of the survey years, show no trend for LP/VNs, a slight increase for aides, but a fairly clear trend for RNs, with 4 percent leaving the hospital of employment in 1983, rising to just under 6 percent in 1985. RNs who were newly hired in 1983 were just under 5 percent of the total employed, rising to over 7 percent in 1985. This would indicate a consistent rise in turnover activity with a slight net gain in RN employment, assuming that this one quarter's data are representative of annual employment behavior.

The comprehensive hospital personnel data covering the period 1981-1985 suggest the impact of cost containment approaches, including the 1983 implementation of Medicare's prospective payment system on the employment of nursing personnel. The impact may come from changes in the number of admissions or the length of stay of patients. A decrease in admissions, with no increase in length of stay, would mean that the total number of days that nursing personnel were needed would decline. A decrease in the length of stay would result in patients being in hospital only for those days when they need the acute care provided by hospitals. The admissions

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[4]Only community hospitals that responded to all data areas of interest to this analysis are considered here (N=488). However, no information was available to be used to determine whether or not this sample is representative of all community hospitals for the measures cited above.

for all non-Federal, short-term general hospitals declined by 8 percent from 1981 to 1985, with more than half of this decline occurring between 1984 and 1985.

The average length of stay declined from 7.6 to 7.1, and the average daily census also declined by 11 percent, for the same time period (AHA, 1986). These changes occurred as the number of registered nurses employed in community hospitals were increasing and those of other nursing personnel were declining. These data would seem to indicate that hospitals across the country have made the determination that while admissions and length of stay are down, the care needed by those hospitalized is such that an upward shift in the level of nursing personnel delivering these services is required. It has been reported that hospitals, particularly those with the highest vacancy rates, are making increased use of temporary nursing services to maintain their staffing ratios (AHA, 1987).

Cost containment measures have stimulated hospitals to make substantial changes in many areas, including increasing the degree of specialization of care required on nursing units by grouping like patients to a greater degree than ever before, changing the distribution among the types of nursing staff, and shortening the inpatient hospital stay to only the days of highest acuity. As the complexity of care requirements increased, the ratio of registered nurses to other staff has increased. A recent study of the impact of DRGs on magnet hospitals (hospitals identified in a previous study as those described by nurses as "good places to work") found definite movement toward an all registered nurse staffing mix (Kramer and Schmalenberg, 1987). Hancock and others (1984) examined the cost differential between an all registered nurse staffing pattern and one with mixed nursing personnel and found that the all RN pattern was more costly, principally because of the wage structure differences represented between the patterns. Others, while recognizing the cost issue, have described an all registered nurse staff as more flexible and as providing better quality of care (McCormick, 1986).

Great variability among studies on nurse staffing have been reported. Particularly difficult has been the lack of a clear understanding in the studies as to what constitutes nursing work and who should perform it (Halloran and Vermeersch, 1987). A recent study by Prescott (1986) found that a substantial amount of variability in vacancy, stability and turnover among registered nurses at the hospital unit level can be accounted for by nursing workload, basic working conditions, the nature of nursing practice and characteristics of staff and head nurses as well as job satisfaction. There are indications that a new form of job dissatisfaction among registered nurses has arisen, in that nurses no longer see their patients getting better, or getting well, because they see them only at their sickest (Kramer and Schmalenberg, 1987).

Questions about the adequacy of the approach within the diagnostic related groups (DRGs), the method used in the Medicare prospective payment system, to measure nursing care resource requirements and to pay for those costs continue to be a focus of attention of a number of nursing groups. Additional concerns have been raised about the adequacy of DRGs in reflecting the intensity of care requirements of certain populations, such as elderly patients and those with complex and multiple systems disorders occurring simultaneously.

In a recent study of nursing intensity as measured by DRGs, Thompson (1987) found for the Health Care Financing Administration that it was possible to encompass variations in nursing intensity in a prospective payment system; that intensity is best measured by the care given in two services, one for routine care and one for special care; that the measurements made were consistent with clinical judgments; but, that the measurements do not reflect the precision necessary to form the basis for a payment system. The relationship between nursing resource utilization, as reflected in total nursing minutes, and length of stay was found to be consistent with the findings of the 1985 pilot study conducted by the Center for Research of the American Nurses' Association (ANA, 1985), and funded by the Health Care Financing Administration.

Quantifying nursing care as a specific component of hospital costs is recognized as difficult to accomplish. It has been noted by some hospitals that do not track actual nursing costs risk unanticipated cost overruns. Developing means to identify nursing services costs and revenues is the focus of an ongoing effort of the HRSA's Division of Nursing.

Participants at a recent national invitational conference on costing of hospital nursing services, convened by the Division of Nursing, made several recommendations. One of these recommended that the basis of costing nursing services be shifted from the activities of nurses to patient-based measures. Participants expressed concern that separating professional nursing activities from the context in which they are carried out removes them from the reason for which they are occurring. Removing nursing services from their context can also materially affect the availability of resources from payments for these services. Two groups have recently considered future research needs in the areas of nursing management and nursing productivity and developed research priorities (Davis, Levine, and Sverha, 1986; AONE, 1987).

Hospitals have also been restructuring and taking a decidedly business approach to governance and management. Formation and expansion of multi-hospital and multi-institutional systems has continued, leading to greater demand for nursing management competence and for development of new ways of managing the increasing clinical diversity that has occurred. Chief nurse executives working in hospitals in multi-hospital systems were found to have considerable power in decisions related to nursing operations, such as budgets, marketing and staffing; but lesser involvement in those decisions related more to hospital operations, such as formulation of the hospital strategic plan (Harrison and Roth, 1987). Nurses in central positions in corporations have tended to hold those positions because of some specialized expertise. They have staff rather than line positions and are able to influence nursing practice within the hospitals in the corporation (West, 1987).

The type of nursing service delivery system can also affect the number and skill mix of hospital nursing staff. In the 1985 American Hospital Association survey of hospital nursing personnel, (AHA, 1985) which collected data on staffing and registered nurse employment conditions from a sample of community hospitals, there was evidence that a variety of

approaches to nursing care delivery are used. About 20 percent of hospitals indicated that no one specific delivery system was used for most of their patients.

In response to a question asking for the percent of hospital inpatients who were cared for under various nursing delivery systems, 3 out of 10 indicated that at least 75 percent of the patients were cared for under a team nursing delivery system. Team nursing was described as the "provision of nursing care for a group of patients in which a registered nurse team leader directs and supervises a group of nursing personnel."

The use of functional nursing (the provision of care by nursing personnel being assigned discrete tasks, such as taking temperatures) continued to decline, with only 6 percent of the hospitals indicating that this method of care delivery was used for at least 75 percent of their patients.

Some version of "primary nursing" was used by 36 percent of hospitals to provide nursing care to most of their patients. Several approaches to primary nursing were considered. Total patient care, described as provision of patient care whereby each of the nursing staff is assigned to give complete care to a group of patients during a given shift, was reported by about 21 percent of the hospitals as the method used for most of their patients. Modular nursing, described as provision of patient care in which a primary nurse-to-patient relationship exists for a group of patients in a given location, was reported by 7 percent of the hospitals. Primary nursing, described as provision of patient care in which a registered nurse assumes responsibility for all nursing care provided to a group of designated patients throughout the duration of their hospitalization, was reported by about 9 percent of the hospitals.

Primary nursing is the most integrated form of professional nursing practice, with delegation of full authority to the primary nurse and strong collegial relationships from other nurses and providers as requested. This method of clinical practice increases autonomy in nursing practice and clinical decision-making and assigns full responsibility for implementing the nursing process for a designated group of patients.

The recent reexamination of magnet hospitals, where primary nursing is the dominant delivery system, surfaced questions about the hospital's ability to maintain primary nursing under current hospital utilization patterns (Kramer and Schmalenberg, 1987). Major inhibitors to continuing primary nursing in the hospitals studied resulted from disrupted continuity on the part of patients and staff in a shortened length of stay, increased use of part-time staff, and voluntary or mandatory furloughs on low census days that interferes with continuity of contact between primary nurses and their patients.

Individual and groups of hospitals are developing means of recognizing the professional competencies of their staffs. Some have instituted career ladders to reward professional capabilities while enabling those most experienced to remain in direct clinical practice. These alternate compensation systems have been well described and examined for their cost effectiveness (Vestal, 1984). Beth Israel Hospital in Boston has

established The Center for the Advancement of Nursing Practice to provide opportunities for professional nurses to refine and enrich their clinical practice through research and other scholarly activities. To accomplish this, the Center will pool the talents of the hospital's nurses with those of professional nurses from other settings, nurse scholars, nurse faculty, and members of other disciplines.

Nursing Homes and Extended Care Facilities. Nursing homes and related facilities continue to grow in number and continue to be the second largest employer of nursing personnel. In 1985 the 19,100 facilities had 1,624,200 beds with 1,491,400 residents, representing a 92-percent occupancy rate. In 1977, 18,900 nursing homes with 1,402,400 beds and 1,303,100 residents for an occupancy rate of 89%. The proportion of facilities that are proprietary continues to be significantly larger than that for nonprofit or government-owned facilities. Proprietary homes accounted for 75 percent of all homes in 1985 and 69 percent of the available beds. More than 75 percent of all nursing homes were certified as skilled nursing facilities (SNFs) by Medicare and Medicaid, as intermediate care facilities (ICFs) by Medicaid, or as both. Those not certified come from the group of smaller nursing home-facilities which represent only 11 percent of the total nursing home beds. Forty-eight percent of the homes were certified as SNFs either alone or in combination with also being certified as ICFs. Almost two-thirds of all of the nursing homes' beds were in homes certified as SNFs (Strahan, 1987).

The Division of Nursing, Bureau of Health Professions, had an interagency agreement with the National Center for Health Statistics (NCHS) through which, as part of the National Nursing Home Survey (NNHS), data were collected on health manpower in nursing homes and on the recruitment and retention of registered nurses in these facilities. The Division of Nursing now has a contract with Research Triangle Institute to complete a special study of these data to identify factors that affect the recruitment, retention and utilization of registered nurses in those settings.

Nursing care is the principal service required by residents in nursing homes. Of the estimated 704,300 full-time equivalent nursing personnel working in these facilities, 12 percent are registered nurses, 17 percent are licensed practical nurses, and 71 percent are nursing aides and orderlies. These employees accounted for 61 percent of the total 1.2 million FTEs in nursing homes. This averages to about 43 FTEs for each 100 beds. Nursing aides, who work under the direction of licensed nurses, were by far the largest group, accounting for over 40 percent of the total FTEs.

There is considerable variation in the distribution of nursing personnel along regional and State lines. The latest State data are shown in table 10-14. The National Nursing Home Survey carried out in 1985 shows a direct relationship between certification status of the nursing home and the number of FTEs per 100 beds. Individual States have set minimum requirements for registered nurse staffing in nursing homes. An analysis of these State requirements as related to the more than 19,000 nursing homes was made by the Research Triangle Institute in connection with the

study it is carrying out for the Division of Nursing. The analysis found that: 6 percent are required to have an RN for all shifts; 12 percent must have a full-time RN and the director of nursing must be an RN; 14 percent must have one full-time RN; 17 percent must have an RN director of nursing only; and 52 percent are under no requirement for full-time RN coverage.

As part of the 1985 National Nursing Home Survey, a sample of registered nurse employees in the nursing homes were asked to respond to a questionnaire designed to collect data on their characteristics, selected work activities and working conditions, and factors which would influence their recruitment and retention in these facilities. Based on the responses from the sample, a preliminary analysis of the data showed that 4 out of 10 registered nurses worked in nursing homes in which they were employed for 5 years or more. Three-fourths of the RNs employed full time earned less than $400 a week. The majority of the RNs were 45 years of age or older and had as their highest educational preparation a diploma in nursing. Reflecting the predominance of proprietary nursing homes, the majority of RNs were employed in settings with this form of ownership.

The preliminary analysis also indicated that 21 percent of the registered nurses were in staff nurse positions and that over half of the registered nurses were employed in some form of supervisory capacity that included direct care responsibility such as charge nurse, head nurse or supervisor. In addition, 17 percent held the position of director or assistant director of nursing and 2 percent were administrators of facilities. Less than one percent of the nurses were in positions as clinical specialists or nurse practitioners. The recent IOM study points to the importance of nurses with advanced expertise and competence in nursing specialties, particularly gerontological nursing, who can bring about change in patient outcomes in these facilities (IOM, 1986).

In the NNHS survey, a list of 45 factors covering working conditions and professional issues were provided to the nurses working in nursing homes and extended care facilities. They were asked to rank each factor's level of importance from "not important" to "all important" in terms of recruiting and retaining nurses. Preliminary analysis of the responses to the survey indicates that 28 of the itemized factors were considered of high importance to the retention of registered nurses by the majority of those employed in nursing homes. Similar factors were shown to influence both recruitment and retention. Particularly high on the list of these factors ranked as being of major importance for retention were the following:

	Percent ranking as "all" or "very" important
Well-equipped facility with functional nursing units	98
No-cost or contributed hospitalization insurance	87
No-Cost or contributed medical-surgical care insurance	86
Graduated vacation plans according to service length	85

	Percent ranking as "all" or "very" important
Pay increases according to service length	83
Pay increases according to merit	80
Provision of comprehensive orientation program for those newly hired	78
Provision of inservice education	77
No-cost or contributed retirement plan (other than Social Security)	74
Availability of support services to do necessary tasks	74
No cost or contributed dental insurance	72
Availability of physicians	69
Reimbursement for expenses for continuing education	66

These data show that several of the factors considered of major importance to the nurses employed in nursing homes were directly related to length of service. Nursing salaries in nursing homes historically have generally been lower than in other health care facilities (see table 10-15). The 1985 NNHS questionnaire listed nine patient care activities for the registered nurses employed in these settings to rank according to the degree of their involvement in the activities. The two ranked as among those activities that the RNs are "always" involved in during the normal work day were: assigning and supervising nursing personnel giving care, by 64 percent; and observing and recording, by 63 percent. The majority of those responding "always" administered routine therapies, and almost half were "always" involved in determining patient care plans. However, the majority were "seldom" or "never" involved in giving personal care, nor involved in planning and providing diversion/recreation programs.

The resident population of nursing homes includes representatives of all age groups from infants to the elderly. Only 5 percent of elderly people in the Nation reside in nursing homes. Of the estimated 1.5 million nursing home residents, 88 percent were 65 years or over. This group was comprised of 45 percent 85 and over, 39 percent age 74 to 85 and 16 percent aged 65 to 74. Four out of 10 of all nursing home residents were 85 and over. Thus, while only 5 percent of all elderly persons were in nursing homes, 22 percent of those 85 years old and over were in such residences. The 1985 NNHS, when compared with the 1977 NNHS, showed that elderly residents were more dependent in performing the activities of daily living (ADLs) in 1985 than in 1977. Sixty-three percent of the elderly residents were estimated to be disoriented or memory impaired to such an extent that it affected their performance of ADLs nearly every day in the 1985 study (Hing, 1987).

Most of the nursing care in nursing homes and other long-term care facilities is provided by personnel with lesser training than registered nurses, and few of them have had formal preparation in gerontological/geriatric nursing. Nurse aides have minimal preparation for their activities and high turnover rates. The IOM study notes that it is difficult to assure quality of care in settings where this level of inexperienced nursing personnel is the dominant or only source of direct care (IOM, 1986). Moreover, in most facilities the availability of physician coverage to fill this gap in supervision is limited. The 1985 NNHS data show that only 1.5 percent of all certified nursing homes have a physician on the premises at all times. Six percent have physician coverage during the day each weekday and on-call; 48 percent have coverage scheduled monthly and on-call; 30 percent have on-call coverage only; and 10 percent have other arrangements. It is clear that the predominant service provided in these facilities is nursing care and that it is mainly provided by aides, who have less preparation than all other nursing personnel.

A recent forum discussed the outcomes of a 6-year effort supported by the Robert Wood Johnson Foundation to improve the long-term health care of elderly Americans by helping university schools of nursing to establish clinical affiliations with nursing homes. This effort clearly established that the caring model rather than the curative model was the basic model of service delivery in teaching nursing homes (Heyssel, 1987). The strategy behind this effort was to devise a means to overcome the professional isolation of nurses working in nursing homes by increasing the quantity and quality of nursing care provided there, increasing the affiliation of professional nurses with nursing homes, establishing nursing homes as a valid nursing practice for nursing students, and increasing the number of nurse faculty who practice in these sites (Lindeman, 1987).

Full evaluation of this effort will not be available for some time, but preliminary data suggest that: the well-being of residents in the teaching nursing homes improved in several areas; the methods of nursing practice changed and the quality of care increased; the clinical understanding of long-term care within the nursing homes and within the academic institutions increased; and nursing research was initiated at these sites and disseminated.

Public/Community Health Nursing. The terms "public health nursing" and "community health nursing" were differentiated by the participants of a national invitational conference convened under the auspices of the Division of Nursing in September 1984 (Anderson and Meyer, 1985). Agreement was reached that "public health nursing" signifies a specific kind of educational preparation, whereas "community health nursing" denotes the setting for the practice of nursing.

At the basic level, a public health nurse is one who holds a baccalaureate degree in nursing that includes theory and supervised clinical practice in public health nursing. A "public health nurse specialist" is prepared at the graduate level with a focus in the public health sciences and holds a master's or doctoral degree. Such a person may or may not practice in an official public health agency but is qualified to do so.

The term "community health nurse," on the other hand, refers to any nurse working in the community. This may be a nurse providing tertiary care in the home, a school nurse, an occupational health nurse, one who works in a correctional facility, in a rural health center or in any setting outside of a health-related institution. A "community health nurse specialist" is a nurse with at least a master's degree in any area of nursing, such as maternal-child health, psychiatric-mental health, medical-surgical nursing or some subspecialty of any clinical area. The term "community health nurse" is simply an umbrella term used for all nurses who work in the community, including those who have formal preparation in public health nursing.

The November 1984 National Sample Survey of Registered Nurses reports that 101,430, or 6.8, percent of a total of 1,485,725 nurses employed in nursing practiced in the community setting. The largest percentage of these nurses were employed in city, county and State health departments and in visiting nurse services. Included among those who practice in the community, although much fewer in number, are those employed in community mental health centers, family planning centers, rural health centers, correctional facilities and hospices.

Data from the 1984 National Sample Survey of Registered Nurses were collected separately on those nurses employed in student health services, occupational health services or other ambulatory care settings such as free standing clinics or health maintenance organizations (HMOs). Those employed in group practice settings such as HMOs will be discussed later in this document. The Survey reports that nurses employed in student or occupational health services make up 2.9 and 1.5 percent, respectively, of the 1.5 million nurses employed in nursing in 1984.

The 1984 National Sample Survey estimates that less than half, or 46 percent, of the nurses practicing community/public health nursing have a baccalaureate or master's degree. More than one-third, or 34.8 percent, have a diploma in nursing and the remaining 19.1 percent have associate degree preparation. Following the definition developed at the 1984 consensus conference, less than half of the nurses employed in community/ public health nursing are educationally prepared to practice public health nursing (Anderson and Meyer, 1985).

The need for nurses employed in official health departments to be educationally prepared to practice public health nursing was confirmed in a study sponsored by the Division of Nursing in 1987. "Public Health Nursing: A Study of the Relationship Between Education and Practice" was carried out to determine the congruency between baccalaureate preparation in public health nursing and the work expectations in those settings where public health nursing services are provided by official public health agencies (USDHHS, DN, 1987). Public health nursing service directors/supervisors and educators from baccalaureate nursing programs participated in focus group discussions held in the nine U.S. census regions. The nursing service directors and supervisors uniformly agreed upon and gave great emphasis to the fact that the minimal preparation of

the nurse who is expected to apply public health principles in practice should be at the baccalaureate level. As already noted, 54 percent of the nursing personnel employed in community/public health nursing in 1984 had diploma and associate degree preparation.

Moreover, the public health nursing service representatives of local health departments, who participated in the focus group discussions, attributed their inability to hire more baccalaureate-prepared nurses, in part, to: 1) the inadequacies of the clinical practice component of the baccalaureate program; 2) the lack of agency resources, especially time and staff, to enable provision for more reality-oriented clinical practice for students and on-the-job training for new employees; 3) the frequent delay in the introduction of public health principles in the baccalaureate program; 4) the difficulty of the student to conceptualize the role of the nurse outside the more structured and monitored setting of the hospital, which is related to the quality of the student's clinical experience; and 5) the fact that salaries of public health nurses are often lower than those of nurses working in the acute care setting.

Data from the 1984 National Sample Survey bear out the latter mentioned factor. The average annual earnings of registered nurses employed in hospitals in 1984 were $24,188 and for those employed in community/public health, $21,998.

Examination of the expectations of the public health nurse in the work setting during the focus group discussions of the previously mentioned public health nursing study further demonstrates that available funds and general political forces often shape the services provided. A number of the health agency representatives reported the current (early 1987) diversion of funds from the more traditional type program to activities related to AIDS (acquired immune deficiency syndrome) and the provision of health services for the homeless population.

The 1983 National Sample Survey of Licensed Practical/Vocational Nurse Population reports that 13,574 or 2.5 percent of the 539,463 licensed practical nurses employed in nursing in 1983 worked in public/community health. Just as for registered nurses, data were collected separately for licensed practical nurses who were employed in student and occupational health services. It is reported that in 1983, 0.8 percent of the licensed practical nurses were employed in student health and 1.1 percent were employed in the occupational health setting.

According to the 1983 National Sample Survey, the average annual earnings of licensed practical nurses employed full time in November 1983 were higher for those working in occupational health than in any other setting. Average annual earnings were $15,472 for those in occupational health, $13,730 for those in public/community health, and $11,053 for those in student health.

Home Health Care. Home health care has traditionally been provided by community-based nursing agencies and, as such, has been included within the discussion of community and public health agencies in previous reports. With the recent changes occurring in the patterns of hospital discharges,

the profile of individuals requiring home care has changed, as have the types of services being provided. Home health care agencies are expanding and their numbers are increasing as the demand for health care services to home-bound individuals increases. The 1984 Sample Survey of Registered Nurses estimated that almost 3 percent, or 40,000, of the 1.48 million employed registered nurses were working in visiting nurse services and other nonhospital-based home health programs. This estimated number represents a one-third increase since the 1980 Sample Survey. A growing but unmeasured number of registered nurses work in hospital-based home care programs; these nurses are included in the counts of registered nurses employed in hospitals.

According to the Health Care Financing Administration, the estimated national expenditures for home care services were about $4 billion in 1986, with Medicare reimbursement accounting for 50 percent. As a result of public policy initiatives, co-pay requirements and incentives from third-party payers, patients and their families are using home health care services: 1) to care for those discharged from hospitals in a stage of convalescence when self-care alone is not possible; 2) to assist with medical technology in the home; and 3) as an alternative to confinement in long-term care institutions.

The financial incentives of the prospective payment system appear to be encouraging hospitals to discharge patients sooner and at a lower functional status, resulting in increasing numbers of subacute patients affecting the community system of care (Sanker, Newcomer and Wood, 1986). There is limited data-based information about how many people are being served by home care agencies, the quality of those services and who is providing those services.

Home health care agencies have existed in some form for at least a century, but their growth began with the advent of Medicare; and further stimulation, as an outgrowth of prospective reimbursement mechanisms for hospitals, is expected. Limited data are available on the characteristics of home health agencies that are Medicare-certified but there is no national survey data on home health care agencies other than those participating in Medicare. Hoyer (1987) reported that increasing numbers of home health care agencies are being established that are not certified as Medicare providers because they limit their clientele to private-pay patients, and in some cases the private-pay agency is an offshoot of an agency that does accept Medicare patients.

Home health care services are provided by a variety of different types of agencies. The visits made by these agencies are financed by Medicare Medicaid, commercial health insurance and self-payments. Medicare certified home health care agencies increased from 2,496 in 1977 to 5,897 in 1986 (USDHHS,HCFA, 1987). This growth has taken place primarily in proprietary and hospital-based home care agencies (GAO, Dec. 1986). These proprietary and hospital-based agencies represent the largest number of agencies, followed by government agencies, private nonprofit and visiting nurse associations. Medicare finances by far the largest portion of home health care. In 1985 there were 39,345,000 visits financed by Medicare, more than double the number of such visits in the late 1970s (USDHHS, HCFA,

1987). Visiting Nurse Associations and proprietary agencies together provided more than half of the Medicare-reimbursed home care visits in 1984, followed in descending order by private nonprofit agencies, hospital-based agencies and government health agencies (HCFA, 1987). The remaining type--combined government and voluntary agencies--provided less than 1 percent of visits.

The percentage of Medicare reimbursement for home care services by type of agency follows the same pattern. With the change to a prospective payment system for hospitals, the number of home health care agencies associated with hospitals is reported to be increasing. Linkages with home care agencies are frequently part of the overall marketing strategy of the associated hospital. Some have indicated that these linkages may limit patient and family options in selecting a home care agency for their circumstances (Rinke, 1987).

There are also significant differences found between hospital-based and community-based home health care patients: in one study, for example, hospital-based patients were older, were more limited in their functional ability, received higher intensity of care, utilized a greater proportion of therapeutic services, and were in an acute care facility prior to home care (Balinsky and Rehman, 1984). Most services provided by home care agencies fall in two general categories: health care services and social services. Some examples of social services are social service evaluation and counseling, homemaker and companion services. Health care services can be divided into direct clinical services and indirect care services, such as the rental and sale of durable medical equipment.

Nursing care is the principal direct clinical care service provided by home health care agencies. In the past, nursing care of the sick, and health promotion and disease prevention activities were among the direct clinical services available from visiting nurse associations and community/public health nursing agencies throughout the Nation. That is true today, but nursing administrators of home care agencies have indicated that the acuity of illness and the complexity of cases, particularly as a result of early hospital discharges, has risen in recent years to the point that care of the sick is now the principal clinical service provided (Hubbard, 1987). There is no known data on the use of and expenditures for post-hospital subacute care, nor any specific national data about who has been using home health care (GAO, Jun. 1986, and GAO, Dec. 1986).

However, the elderly are the major users of home care services, and the chronically ill elderly were over three times more likely than other elderly Medicare beneficiaries to use home health services (GAO, Dec. 1986). There is also a large number of younger people who use home care services that are usually non-intensive and of short duration (Berk and Bernstein, 1985). Branch (1987) reports that those who live alone and need care go into nursing homes rather than receive home care services but Kover (1986) and Beland (1985) report that those who have family members or other help available to assist with care are able to stay in the community. Age of the patient and difficulty in coping with the instrumental activities of daily living are identified as the best predictors of home care use (Shapiro, 1986). Given the likelihood that older people will be living

alone--many without a support network, as spouses, siblings and children die--they will be increasingly unable to maintain themselves in the community without support services, such as those from home care agencies.

The clinical nursing service available from home care agencies may be provided by registered nurses, licensed practical nurses or home health aides, depending upon the type and complexity of the care that is given. Data compiled in 1982 by the Health Care Financing Administration and a 1983 survey of home care agencies indicate that 37 percent and 45 percent, respectively, of all FTEs in Medicare-certified home care agencies studied are RNs, and that 25 percent are home health aides, and 38 percent are homemaker/home health aides, respectively (Subcommittee, 1984). As hospital patients are discharged earlier than has been the practice previously, more of them are needing to continue the use of sophisticated technological devices at home, which compounds the complexity of their care requirements.

Nursing personnel practicing in home health care agencies in the past required a sound knowledge of community/public health practices and some knowledge and skill related to care of the sick. Increasingly, these staff members must now also be well grounded in acute care nursing as well. In addition, they must be prepared to care for a wide range of age groups, because home care patients range in age from newborns to the oldest elderly. Also, the variety of specialized nursing needs found in the home care population requires that nurses who practice in home care have specialized knowledge and skill or have access to such on a consultative basis.

Registered nurses assess each home care services patient, plan and evaluate the patient's care, and make a determination as to the appropriate nursing staff member to carry out the required nursing care. With the current rate of acuity, it is frequently a registered nurse who must give the direct care; at other times, the services of a home health aide will suffice. Home health aides receive special training, are part of the nursing staff of a home health agency, and work under the direction of a registered nurse. Aides provide assistance with activities of daily living, such as assisting with baths, toileting, mobility and the like.

The task of providing appropiate and high quality home health care services begins with planning for such care prior to its initiation for a particular patient. Hospitalized patients need to be assessed early in their admission for post-hospital health care requirements, and discharge planning must be begun (Feather and Nichols, 1984). Continuity of care requires that hospital and home health care agency nurses communicate and plan post-hospital care. Early and carefully planned discharge and home follow up is reported to benefit low-birth-weight infants and, for example, to substantially reduce the cost of their care (Brooten, et al., 1986).

Because of the importance of family support systems to those receiving home care, recognizing the contribution of family members and having a working knowledge of family structure and functioning should also facilitate successful outcomes (Pless, 1984). Careful assessment of family members' capability to assume care responsibilities for those receiving home care is

essential, because without such assessments untoward outcomes may occur (Kaye, 1985). Home health care agencies have developed various methods of organizing their services and responding to their patients' requirements. For example, the Visiting Nurse Association of Morris County, New Jersey, has developed the Complex Care Team that offers around the clock, highly specialized nurses who can provide the level of care needed by very ill patients and by those using mechanical devices, such as ventilators (Bowyer, 1986).

Nursing education programs are responding to the increased movement of patients to the community, and particularly to home care. A recent study indicates that schools of nursing are carrying out extensive activity in response to changes within the home health care field (Barkauskas and Blaha, 1987). Programs at the associate and baccalaurate levels have developed special clinical experiences that prepare their graduates for clinical practice in home health care (Hanner, 1985). Several new graduate programs that prepare nurses for practice as administrators or managers and as clinical specialists for home health care agencies have opened. The first program to prepare nurses specifically for management in home health agencies was the University of Michigan School of Nursing.

Faculty developing these programs have found that there are unique combinations of knowledge and skills required for practice in these settings that are different from those needed in the past. Innovative programs are responding to these challenges. Boston University School of Nursing, for example, has developed a master's program in home health care that builds on the existing public health nursing master's program and prepares both administrators and clinical specialists. The University of Virginia School of Nursing, building on the child and adult health speciality programs, is preparing nurses for advanced practice as case managers, which is an expanding role for nurses.

Other Ambulatory Settings. This section addresses the employment of registered nurses and licensed practical nurses in a variety of ambulatory care settings. Included are both of these categories of nursing personnel employed in offices of physicians or dentists in solo or group practice, and in health maintenance organizations (HMOs). It further includes registered nurses in solo practice or in partnership with other nurses, physicians or other health professionals.

The 1984 National Sample Survey of Registered Nurses found that 7.2 percent (106,588) of the total 1.5 million employed nurses were employed in these ambulatory care settings. The 1983 National Sample Survey of Licensed Practical/Vocational Nurses found that 9.1 percent (48,969) of the total number of licensed practical nurses (539,643) were working in those settings in 1983. Included in this category are those employed in HMOs. The proportion of all registered nurses and licensed practical nurses who were employed in HMOs were, respectively, 0.6 percent (about 8,200) in 1984 and 0.7 percent (about 3,828) in 1983.

InterStudy, a group that conducts an annual census of HMOs, reports a dramatic increase over the past few years in both the number of HMOs and number of enrolled members (InterStudy, 1987). Between 1985 and 1986, InterStudy reported a growth in the number of HMOs and enrollments of 30.4

percent for a total of 626 HMOs in 1986. Enrollments increased 22 percent for a total of 25.8 million enrollees in 1986. It seems safe to assume that the growth of the HMO industry will reflect a corresponding increase in the number of registered nurses and licensed practical nurses working in HMOs.

Selected Areas of Practice

Nurse Practitioners and Nurse Midwives. It is estimated that there are approximately 30,000 nurse practitioners and nurse midwives licensed for practice in the United States (Moses, 1986). Nevertheless, nurse Practitioners and nurse midwives represent a relatively small segment of the total registered nurse work force. According to the 1984 National Sample survey of Registered Nurses, there were an estimated 18,642 registered nurses employed in positions as nurse practitioners or nurse midwives. Of these, 74 percent were estimated to be employed full time and 26 percent part time. Eighty-two percent were working in urban or suburban areas and 18 percent in rural areas. This same geographic distribution of employment holds for the entire employed registered nurse population but nurse practitioners and nurse midwives represent only slightly over 1.2 percent of all employed registered nurses.

Nurse practitioners and nurse midwives are registered nurses who have completed formal programs of advanced educational preparation beyond the basic requirements for licensure as a registered nurse. Educational programs prepare them to function in the expanded role in the delivery of primary health care in a variety of settings. Nurse practitioner functions include: health assessment; physical examination; development of a plan of care; management of minor acute, self-limiting conditions and chronic illness; teaching and counseling of individuals, families and groups; health promotion and disease prevention activities; and coordination of services and referral, when appropriate, to other health professionals.

The nurse practitioner's scope of practice is broad because it includes facilitating access into the health care system as well as providing continuity of care as the client/patient moves from one part of the system to another. Because nurse practitioners are licensed as nurses, they are accountable for their nursing practice and engage in independent decision-making about the nursing needs of clients. In the performance of those components of their role traditionally provided by physicians, nurse practitioners function within the protocols for practice established by the physician and nurse practitioner. Thus, nurse practitioners can independently manage a client without the client necessarily seeing the physician; however, it is always in the context of a system which provides for consultation, collaborative management or referral.

Nurse midwives are prepared to carry out the full scope of nurse midwifery practice, which includes the independent managment of care of essentially normal newborns and women, antepartally, intrapartally, postpartally and/or gynecologically. Nurse midwifery practice occurs within a health system that provides for medical consultation, collaborative management, and referral. The American College of Nurse Midwives, the professional organization of certified nurse midwives, requires that nurse midwives

establish an alliance agreement and health care protocols with a physician in order to practice. These agreements and protocols establish mechanisms for consultation and referral (American College of Nurse Midwives, 1984).

Programs to prepare nurse practitioners or nurse midwives are generally of two types: certificate or master's. The certificate programs require a minimum of 9 months of full-time study; the graduate programs, 1-2 years of full-time study. Both types of programs provide the theory and clinical practice necessary to prepare the nurses to function in their respective roles. However, in the graduate programs, the physical and pschosocial courses are usually taught at an advanced level, building on the basic science courses required for the baccalaureate degree. The graduate programs also include a research component and frequently a minor in teaching or administation.

The Longitudinal Study of Nurse Practitioners, Phase I, reported that 65.5 percent of the nurse practitioner and nurse midwifery programs in 1973 were at the certificate level and 34 percent at the graduate level (Sultz, et al., 1976). By 1980 a follow-up study reported that master's programs has increased to 57 percent of these programs (Sultz, et al., 1980). Federal funding of nurse practitioner and nurse midwifery education has reflected this trend. In Fiscal Year 1986, 85.6 percent of federally funded programs were at the master's level, 14.4 percent were at the certificate level.

Since the majority of nurse practitioners and nurse midwives were prepared prior to 1981, the employment data regarding the type of program in which they received their formal preparation for practice indicate that 70.6 percent received their training in a certificate program and 15.4 percent in a master's program. However, as a group, over 54 percent of nurse practitioners and nurse midwives have either a baccalaureate or higher degree (Moses 1986).

There have been numerous studies to document the impact and effectiveness of nurse practitioners and nurse midwives. The report of the Graduate Medical Education National Advisory Committee concluded that "... nurse practitioners and nurse midwives can make positive contributions to the health care system, can enhance patient access to services, decrease cost and provide a broadened range of services. Certain consumers prefer the non-physician provider" (USDHHS, HRA, 1980). In another study Salkever, et al. (1982) concluded that care by nurse practitioners for many ailments is less costly than care by physicians but just as effective.

Ramsey, et al. (1982) showed that nurse practitioners not only provide primary care equivalent to that of physicians, but also offer something special that increases adherence. Mountain States Health Corporation (1985) reports gerontological nurse practitioners have been credited by nursing home administrators with several health related improvements, including: fewer transfers to hospitals and emergency rooms; an increase in the number of discharges back to the community; a decrease in medications as a result of greater emphasis on nursing care interventions; improved staff morale; and a decrease in staff turnover.

The National School Health Service Project showed that when school nurse practitioners were placed in school settings to provide health care that "... medically underserved children had access to care ... a significant amount of illness was found," and that "almost all the health problems found (96 percent) were followed up and resolved or still under treatment" (Robert Wood Johnson, 1985).

The recent case study on "Nurse Practitioners, Physician Assistants and Certified Nurse Midwives: A Policy Analysis," by the Office of Technology Assessment (1986) also confirms many of the findings reported in other studies. The study's policy conclusions note these health care providers have made important contributions to meeting the Nation's health care needs by: improving access to health care services; improving the quality of health care services; having the potential of reducing health care costs; and increasing the productivity of medical practices and institutions.

Despite the evidence indicating that nurse practitioners and nurse midwives have made positive contributions to the delivery of health care, the Office of Technology Assessment concludes in its report that these practitioners have not been used to their fullest potential and notes that there are major obstacles to their greater employment and appropriate use. The barriers identified were: physician resistance; legal restrictions; inaccessibility and cost of malpractice insurance; and limitations on the coverage and payment for interpersonal and preventive care.

Clinical Specialists and Nurse Clinicians. According to the 1984 National Sample Survey of Registered Nurses, an estimated 23,698 nurses, or 1.6 percent, held the position title of clinical nursing specialist and that 14,731, or 1 percent, held the position of nurse clinician. Among those clinical specialists, 31 percent held at least a master's degree as their highest preparation; and among the nurse clinicians, 7 percent held a master's degree. Although the nursing profession and national study groups, such as the Institute of Medicine and the National Commission on Nursing, have recommended the master's degree for nurses practicing at this advanced level, these percentages suggest that they may have achieved their specialized expertise through continuing education, staff development and inservice training.

Clinical nurse specialists and nurse clinicians, as the titles imply, are expected to be experts in a certain area of clinical nursing practice. They practice in a variety of different types of settings and have different role components. The 1984 Sample Survey estimated that 73 percent of the clinical specialists were employed in hospitals, 13 percent were in ambulatory settings, and 8 percent were in community/public health agencies.

Clinical nursing specialists carry out the roles of an expert in clinical practice, educator, consultant, researcher, and manager (American Nurses' Association, 1986). A report of an evaluation study that examined personnel interaction, among other factors, on patient outcomes from intensive care found that the nursing staff organization, the presence of

clinical specialists, the quality of staff education and other staff-related factors were of major importance to the quality of the outcomes (Knaus, et al., 1986).

As noted by Stevens (1976), the clinical specialist role was not designed to fit into the typical hierarchical management structure of health care institutions, but was a loosely defined role that fit a staff relationship in an institution's structure to facilitate the movement among the role components as clinical circumstances indicated. Increasingly, clinical specialists are including management functions in their role, particularly at the middle management level. This is seen as enhancing the quality of patient care because of the clinical expertise that can be brought to bear on management decisions (Williams and Cancian, 1985), and as enhancing the professional authority of the specialist to bring about necessary change in patient care (Ehrenreich and Steward, 1979; Wallace and Carey, 1983).

Schools of nursing have responded to changing health care needs by developing new graduate programs, and expanding existing ones, to prepare nurses for advanced clinical practice: 1) in growing settings such as home health care agencies, multi-health care systems, and aggregate community and mental health agencies; and 2) in less traditional settings, such as adult prisons, juvenile correctional facilities, and shelters for the homeless. In addition, these schools have established, or are developing, programs that prepare nurses to provide advanced care to the elderly; to critically ill infants; to abused women and children; to those with high-risk pregnancies; to those with newly emerging infectious diseases, such as AIDS; and to those whose care requires the inclusion of new technologies, such as transplantation. The increasing diversity in graduate programs in nursing has led to some efforts to identify the commonalities across programs in terms of the intended outcomes of the programs and the purposes of nursing education at this level (Williamson, 1983; Reed and Hoffman, 1986).

For some time graduate programs in nursing have been expanding content and increasing clinical experiences to incorporate complex technology and to strengthen the capacity of their graduates to function in the rapidly changing health care environment. Changes in programs preparing clinical nursing specialists are reflecting the trend toward the inclusion of advanced assessment and technical management skills, and intense theory and practice opportunities in health promotion, disease prevention and health education activities. Graduates of many of these clinical specialty programs frequently attain sufficient content and clinical experience as students to enable them to qualify for nurse practitioner and other types of advanced practice certification upon graduation.

Nurse Administrators. The 1984 National Sample Survey of Registered Nurses estimated that there are 77,177 (5 percent) nurses holding the position of nurse administrator and 183,602 (12 percent) holding the position of supervisor or head nurse. Nurse administrators, directors and deans of nursing services and schools of nursing are at the highest level of management in the setting in which they are employed, and supervisors and head nurses are usually at the middle management level. The estimated average annual salary for nurse administrators in 1984 was $29,164, and $25,000 for supervisors or head nurses. The estimated average staff nurse salary for the same period was $22,000.

Among the estimated number of nurses with position titles of administrator, 19 percent had a master's degree and 27 percent had a baccalaurate degree, and among the supervisors and head nurses, 8 percent had a master's degree and 52 percent had a baccalaurate degree. Although the nursing profession has recommended that nurse administrators have at least a master's degree, these percentages indicate that the majority of individuals in these positions achieved their management expertise, instead, through experience and continuing education.

Nursing administrators and middle managers have been identified as pivotal to the success of the nursing department; to the development of professional nursing practice within an agency; to the retention of nurses through policies and practices that provide a stimulating climate for staff and a caring environment for patients; and to enhancement of collegial and collaborative relationships through decentralized authority and the provision of professional support mechanisms (American Academy of Nursing, 1983; National Commission on Nursing, 1983; USDHHS, 1983 and 1984). They have also been at the center of efforts to maintain quality care within their settings during a time of restrained resources. With the introduction of a prospective payment system for hospitals, substantial change has occurred in the health care system in terms of the number of patients, their acuity of illness and the impact on community-based agencies from their early discharge.

There is preliminary evidence that hospitals, considered good places to work by nurses prior to these changes, were still regarded in the same way after the impact of prospective payment changes (Kramer and Schmalenberg, 1987). A major ingredient in the success of these "magnet" hospitals was the nurse administrator and the climate, expectations and changes that individual stimulated (American Academy of Nursing, 1983). Four regional nursing compacts--the Midwest Alliance in Nursing Inc., the Mid-Atlantic Regional Nursing Association, the Southern Council on College Education for Nursing, and the Western Institute of Nursing--are carrying out regional activities which examine the impact that recent and proposed changes in reimbursement mechanisms for hospitals will have on health administration education and training. Among the activities being carried out are an examination of the effects on the system of health and nursing administration, on the administrative role that may be necessary, on the methods used in the training of administrators, on the relationships between educational institutions and hospitals used as training sites, and on the financing of such education.

A nurse administrator has responsibility for policy development, fiscal affairs, allocation of resources, strategic planning, and professional practice for the nursing department in a health care setting. As competition continues unabated in the health care industry, the nurse administrator continues to be challenged to maintain both quality services and a sound financial base for the nursing department. Nurses in key management positions in institutional, community-based and corporate nursing services increasingly require a business orientation, and should recognize that nursing practice inherently involves business elements and decisions as well as professional practice components (LaBar and McKibbin, 1986).

Several new and innovative arrangements for nursing services are emerging that will provide an environment conducive to professional nursing practice and a structure suited to autonomy and self-direction for nursing (LaBar and McKibbin, 1986; Coleman, Dayani and Simms, 1984). Since the State of Washington enacted legislation in 1973 that permitted reimbursement for nursing services, 25 States have implemented such legislation. Such changes facilitate expansion of the availability of professional nursing services and practice arrangements. Well-prepared and experienced nurse administrators and changing reimbursement patterns for nursing practice will facilitate these developments.

Nursing education programs have prepared nurse administrators and middle managers at the graduate level by offering both academic majors and minors in nursing administration. These programs have changed in recent years to the point that solid management and financial content have become increasingly common. Some nursing programs have established formal relationships with the business school in their university, resulting in the possibility of students cross-registering for business courses or taking a combined nursing and business degree program.

Considerable discussion has ensued over the years about the appropriateness of preparing nurse managers with some advanced clinical expertise and about the appropriate length and complexity of the management content required. Most recently, the changes in the health care delivery system and the demand by employing organizations for nurse managers to have more business orientation may have overtaken this discussion. Not all nurses wanting additional management preparation will be in a situation to attend a graduate program to achieve this goal. To facilitate such nurses expanding their skills, the Division of Nursing of the Bureau of Health Professions has awarded a contract to the School of Nursing at the University of Alabama at Birmingham to develop continuing education modules on cost management that can be used in a variety of ways to benefit practicing nurse managers.

Today, nurse administrators must have the same fiscal expertise as other health care administrators, be able to direct strategic planning for the department, and set an environment for professional practice where quality care is quantified and achieved. Nurse administrators have been responding to these challenges by developing nursing research departments, or establishing nursing research positions, to enable them to effectively examine productivity, costs, revenues, and quality factors within their settings (MacKay, et al., 1984).

At a recent invitational conference on the costing of hospital nursing services held by the Division of Nursing, it was noted that the major work on developing methods to cost-out nursing services has been carried out by nurse administrators (Lampe, 1987). Nurse administrators were among the participants that developed an agenda for nursing productivity research which will have impact on the future developmemt of research on this complex topic (Davis, Levine and Sverha, 1986). A recent evaluation study of patient outcomes from intensive care found that involvement and interaction of critical care personnel can directly influence these

outcomes. More specifically, it was found that the presence of a central nursing authority and a comprehensive nursing organization that facilitated staff interaction and coordination were very important to overall quality and effectiveness of care (Knaus, et al., 1986).

Nurse Educators. Despite the fact that registered nurses employed in nursing education positions represent only a small proportion of the total registered nurse supply, less than 3 percent, they are key to the assurance of a well-qualified nurse supply. Thus, particular attention has been paid throughout the years to the need for and availability of a cadre of nurses with the particular expertise necessary to provide the appropriate student environment.

Data from a January 1986 study by the National League for Nursing of faculty and administrators in nursing educational programs showed an estimate of about 26,800 nurse faculty in nursing educational programs for registered nurses (Gothler, 1987). Almost half, about 48 percent, were teaching in baccalaureate and/or higher degree programs; about 37 percent in associate degree programs, and 15 percent in diploma programs. In addition to those already employed, there were an estimated 690 budgeted vacant positions for a vacancy rate of 2.5 percent. The vacancy rate was highest in the baccalaureate and higher degree programs where 441 positions, or 3.3 percent of the total, were vacant. In the diploma programs, an estimated 2.1 percent of the total positions were vacant and in associate degree programs, 1.6 percent were vacant.

Vacancies in nursing educational programs may be a reflection of the unavailability of appropriately qualified registered nurses to fill the vacant positions. A graduate degree is generally accepted as a minimum requirement for a teacher of nursing. The November 1984 National Sample Survey of Registered Nurses shows that about one-quarter of those whose highest educational preparation was a master's degree and a little over three-quarters of those with doctorates were in nursing education positions, either teaching or administrative.(See table 10-10.) According to the 1986 National League for Nursing study, about 13 percent of the full-time employed faculty members and 6 percent of the part-time employed faculty members had doctorates. Three-quarters of the full-timers and 64 percent of the part-timers had master's degrees as their highest academic credential. Faculty in baccalaureate and/or higher degree programs were more likely to have higher level degrees than faculty in the other types of programs for registered nurse preparation, as can be seen below:

	Percent with doctorate	Percent with master's	Percent with lower than master's
Total faculty members	11.5	72.3	16.2
Baccalaureate and higher degree programs	20.2	75.9	3.8
Associate degree programs	2.9	70.9	26.2
Diploma programs	1.0	63.0	36.0

Since the 1984 National League for Nursing study of the number and characteristics of nurse educators, the proportion of faculty with graduate

degrees has increased. Improvements in the educational level of the administrators of the registered nurse educational programs can also be noted. Among the 1,439 administrators of these programs reported in the 1986 study, 42 percent possessed an earned doctorate. In baccalaureate and higher degree programs, 77 percent had doctorates.

Data on nurse educators in practical nursing programs were not available from the 1986 study. However, based on the data in the January 1984 National League for Nursing Nurse Faculty Census, there were an estimated 6,239 employed faculty members in those programs and a total of 102 unfilled budgeted positions (NLN, 1986). Thus, there was a 1.6 percent vacancy rate for nurse teaching personnel in such programs. Only 27 percent of these individuals had graduate degrees. The majority, 51 percent, had baccalaureates, and 26 percent had either associate degrees or diplomas as their highest nursing academic credential. Among the administrators of these programs, some 53 percent had master's degrees and 4 percent had doctorates. The remaining administrators were distributed among those whose highest credentials were a baccalaureate, associate degree or diploma, with most of these having a baccalaureate degree.

Nurse Researchers. In recognition of nursing research as a distinct area of scientific inquiry and one that required a more prominent place in the mainstream of biomedical and health sciences, the new National Center for Nursing Research was established within the National Institutes of Health in April 1986. The mission of the new center is to support basic and applied nursing research and research training related to patient care, the promotion of health, the prevention of disease, and the understanding and mitigation of the effects of acute and chronic illnesses and disabilities. Patient care research may address ethical and public policy concerns that will have a profound effect on the delivery of patient care, in addition to other areas.

Prior to the formation of the new center, the Division of Nursing served as the Federal focus for nursing research and for the training of nurse investigators. The functions and staff of the Center for Nursing Research and of the Nursing Research Service Awards Program of the Division of Nursing were transferred to the National Institutes of Health to form the nucleus of the new National Center. The Division continues to serve as the focus for the support of doctoral level nursing programs which provide the basic education for the preparation of nurse researchers. The opening of the new National Center was responsive to the concerns raised in the Institute of Medicine study on nursing and nursing education (IOM, 1983) concerning the lack of a stable base of adequate funding for research and the scarcity of nurse researchers that had inhibited the development of nursing scientific inquiry.

The 1984 National Sample Survey of Registered Nurses estimated that approximately 5,000 nurses, 0.3 percent of the 1.48 million employed registered nurses, held doctoral degrees, the generally accepted credential for research capability. Eight out of 10 of these nurses are employed, most on a full-time basis, in teaching and administrative positions. About 5 percent of the doctorally prepared nurses were estimated to be carrying out research-related functions during all of their usual workweek, and three-quarters were estimated to be carrying out such functions for up to 50 percent of their workweek.

Nurse researchers have principally been employed in schools of nursing, but increasingly are being employed in a variety of practice settings, such as academic health centers, community hospitals, State health departments and home health agencies (Anderson, Roth, and Palmer, 1985).
Results of a recent survey indicate that positions for nurse reseachers in clinical settings are increasing, most nurse researchers in these settings have doctoral preparation, the major role components include conducting and facilitating research studies, most report to the chief nursing executive in their setting, and all of the researchers were funded by the nursing department in the setting (Hagle, et al., 1986).

Rates of Compensation

An overall view of the earnings of licensed nursing personnel according to the settings in which they are employed and the positions they fill is provided by the respective sample surveys. Thus, for registered nurses, data are available for November 1984, and for licensed practical nurses,for November 1983.

Registered nurses employed on a full-time basis averaged $23,505 in November 1984; an increase of 35 percent, or an average of 7.8 percent per year since November 1980. Average earnings varied according to the setting of employment and type of position. As was found in the earlier sample surveys, the lowest average earnings in the 1984 study were for full-time staff nurses in ambulatory care settings. Full-time hospital staff nurses averaged $22,394, an increase of 83 percent since the average found in the September 1977 sample survey. Among staff nurses in the various employment settings, the average for the hospital nurses was the highest while the nursing home staff nurses averaged $18,220, close to that found in ambulatory care settings (see table 10-15).

Average earnings tended to vary according to educational preparation as well, ranging from $22,129 for a full-time nurse whose highest nursing educational preparation was an associate degree to $35,743 for those with a doctorate. However, the positions registered nurses fill vary by educational preparation, and since earnings vary according to position level and employment setting, this factor has major importance when earnings by educational preparation are reviewed. The following information from the November 1984 survey on average annual earnings of full-time employed registered nurses examines the distribution of these according to educational preparation:

	All full-time employed RNs	RNs employed full-time in staff positions
Total	$23,505	$21,704
Diploma	22,963	21,514
Associate degree	22,129	21,298
Baccalaureate	23,995	22,254
Master's	28,763	24,391
Doctorate	35,743	---

Salaries of licensed practical nurses averaged $14,395 a year in November 1983 (see table 10-16). As was the case for registered nurses, their average earnings also varied according to their work setting. Since most of these nurses fill positions as staff nurses, the differences in 55 earnings among the different work settings is most apparent when the earnings of LPNs employed in staff positions is examined. Those employed in physician or dentist offices had the lowest annual average earnings, $12,801. Those in staff positions in occupational health settings had the highest, $15,201, followed closely by the hospital staff nurse, $15,083. As was the case for registered nurses, licensed practical nurses in staff positions in nursing homes averaged far less than those in hospitals. Their average annual earnings were $13,449.

A Look To The Future For Nursing Personnel

Future Supply of Nurses

In order to meet the requirements of P.L. 94-63, Staff of the Bureau of Health Professions developed a model from which the projection of the supply on a national and State basis can be made. The model was built around the dynamics of the flow of nurses in and out of licensure and the work force. For registered nurses, the model also takes account of the varying educational levels which these nurses achieve and the progression from one level to another.

Since there are several dimensions to the study of the nurse supply, the model develops data on 1) the population of nurses--all those with State licenses to practice as of the date in question; 2) the supply itself--all those employed or available for employment if sufficient positions are not available at the time being considered; and 3) the full-time equivalent supply which expresses employment independently of full- or part-time status. The data are presented on a State-by-State basis and aggregated to the country as a whole. To the maximum extent possible, the model integrates and draws upon a number of discrete surveys describing various phenomena affecting the nurse supply. Most of these surveys have been described in the earlier discussion on the supply of nurses. Central to the data base for the model, however, are the sample surveys of nurses. A full methodological description of the modeling approach being used can be found in the Third Report to the Congress (USDHHS, DN, 1982) and in the Source Book: Nursing Personnel (USDHHS, 1981).

Licensed Practical/Vocational Nurses. The availability of data from the November 1983 National Sample Survey of Licensed Practical/Vocational Nurses provided a data base to develop projections of licensed practical/vocational nurses. The initial projections developed from that data base can be found in the Fifth Report to the President and Congress on the Status of Health Personnel in the United States (USDHHS, BHPr, 1986). In this report, those projections have been revised to take account of some more recent trends in graduations from practical nursing programs. Since 1983, however, significant changes have occurred in health care delivery. These changes are known to have affected the utilization of licensed practical nurses in various employment settings.

At this time, the exact extent to which they may have affected the overall supply is unknown. Therefore, the licensed practical/vocational nurse projections presented in this report might very well not be reflective of current conditions and trends, and should be viewed within that context.

A number of assumptions are required for these projections. Most important among these are assumptions about what the number of graduations might be in the future and about what proportion of the nurse population might be employed or available for employment (activity rates). In making projections of graduations for the future, it was assumed that the noted trends of the past 2 years in the number of practical nursing admissions, enrollments and graduations would continue throughout the projection period. Since academic year 1982-83, the figures in each of these areas have declined by as much as 20 percent. This trend is expected to continue as more and more practical nursing programs close their doors and as higher proportions of potential students for these programs choose to attend associate degree programs preparing for registered nurse licensure rather than practical nursing programs. These overall assumptions have led to a projection of 28,300 practical nursing graduates by 1999-2000 and 21,000 graduates by 2019-2020 (see table 10-17).

The proportion of the licensed practical nurse population that might be available for employment in the future was based on data from the November 1983 survey. The basic assumption was made that licensed nurses would be inclined toward employment as practical nurses in much the same proportion as the 1983 population, given the age distribution of the population at the date for which the projections would be made.

Based on these assumptions, along with consideration of such other factors as the proportion that might no longer be licensed or may reactivate an expired license, mortality, the proportion of graduates that seek and attain licensure, and interstate movement, it was projected that there would be a national supply of 717,000 licensed practical nurses by December 31, 2000 (see table 10-18). A total of 675,500 was projected for December 31, 2020. Thus, it was projected that the number of licensed practical nurses that would be available to practice would increase by about one-third, 33 percent, between 1983 and 2000. By the year 2020, however, the number available to practice would only be about one-quarter, 25 percent, greater than the 539,500 employed in 1983.

While the model has projected an increasing national supply of licensed practical nurses up through 2006, following which a decline is evidenced, these figures should be viewed with some caution as stated earlier. Recent data from the American Hospital Association on the numbers of licensed practical nurses employed in hospitals show a decrease for the past few years. However, it is difficult to anticipate what the retention and utilization of these nurses within various employment settings would be in the future. Expansion of employment of these nurses in nursing homes and perhaps in the home health area may offset declines in hospitals. Preliminary data from the 1985 National Nursing Home Study (Strahan, 1987) indicate that utilization of licensed practical nurses in that setting has increased. For the aforementioned reasons and because the data base used to develop projections for each State is a sample

subject to variances that could be sizeable in the smaller States due to relatively small samples, State-by-State projections of licensed practical nurses are not presented in this report.

It was projected that the age level of the licensed practical nurse population would increase over the period. By the end of 2000, it is expected that the relative proportion of those who were at least 40 years old would increase to about 66 percent from the estimated 46 percent in 1983. By the year 2020, the proportion of those in the population who were 40 years of age or over is anticipated to increase to 77 percent. The median age of the licensed practical nurse population at the end of 2020 is expected to be about 53 or 54 in comparison to a median age of about 39 in November 1983. Because of the concentration of the population in the mid years throughout the period--the ages at which these nurses had the greatest propensity to work--it is not expected that there would be any significant single year decrease in the activity rate. However, because of the aging of the licensed practical nurse population, the activity rate for these nurses gradually decreases from 69 percent in November 1983 to about 60 percent through the year 2020.

Registered Nurses. Many of the assumptions upon which the projections of registered nurses available for employment through the year 2020 are based were derived from the trends noted in the 1977, 1980 and 1984 National Sample Surveys of Registered Nurses. The data set from which the projections are initiated in this report comes from the survey conducted in November 1984. The projections of RNs incorporate the level of educational preparation nurses have achieved. The major factors in the registered nurse projections are assumptions about graduations from nursing educational programs, both entry level and post-RN graduates, licensure phenomena, and the proportion of each segment of the population that might be available for employment.

In looking toward the future, past historical trends in numbers of educational programs and students, as well as some general assumptions about the direction that admissions to nursing educational programs might take, formed the basis for the projections of the number of graduates to the year 2020. Working under a general assumption that there would be no fundamental changes in the educational system preparing for registered nurse licensure, projections were based on statistical trends developed under the following assumptions about each of the program types.

For diploma programs, it was assumed that current trends in the numbers of programs and students would continue throughout the projection period. The rate of decline in the number of programs is anticipated to increase due to a number of effects, including the possible elimination of the reimbursement of educational costs under Medicare. It is expected, however, that there will be some remaining diploma programs through the end of the year 2020. These assumptions lead to a projection of about 2,000 diploma program graduates by 2019-2020 (see table 10-19).

For the associate degree and generic baccalaureate degree projections, historical data on the numbers of programs and students were supplemented with information on female "first-time" freshman enrollments in

institutions of higher education from the Center for Education Statistics, U.S. Department of Education (1964-1968), and population statistics from the Bureau of the Census, U.S. Department of Commerce (1984, 1986). These variables were included in the regressions used to project associate degree and generic baccalaureate students in order to: 1) capture some aspect of alternative training or career paths that women seeking higher education might pursue; and 2) because associate degree and generic baccalaureate students are drawn from the same population groups, to capture a measure of the size of the potential pool of students available to seek a nursing or an alternative career.

The number of programs is expected to remain relatively stable over the projection period. The trends evidenced in the last few years for admissions, enrollments and graduations from these programs are expected to continue. The dominant measurement of changes in associate degree programs is related to the potential student body available to attend these programs, primarily the 17- to 44-year-old female component of the population. This component of the total population is expected to decline over the projection period. Examination of the decline in this segment of the population on a regional basis indicates that the greatest losses occur in the States in the Middle Atlantic, East North Central and West North Central regions of the country. States within the West South Central and Mountain regions show the greatest growth, while States within the South Atlantic and Pacific regions show lesser growth in this segment over the projection period. Similarly, the projections of associate degree students evidence these same trends. These assumptions, along with other influences, result in a projection of 42,100 associate degree graduates by 1999-2000 and 35,400 graduates by 2019-2020.

For baccalaureate programs, the trends evidenced in the last few years for new, basic student entrants into these programs suggested that the number of these students would slightly increase over the projection period. Therefore, in order to capture current concerns about decreasing enrollments in baccalaureate nursing programs, data on enrollments from the American Association of Colleges of Nursing's Institutional Data System Series were examined (AACN, 1987). These data suggested a more constrained picture. Accordingly, two sets of generic baccalaureate graduate projections have been developed. The first of these, Series A, presents a "constrained" baccalaureate picture based on an adjustment factor derived from the AACN survey data. The second, Series B, presents a continuation of trends evidenced for the past few years. As was true for associate degree programs, generic baccalaureate students are primarily from the 17-to 44-year-old female segment of the population and the projections were largely influenced by the proportion of the total population that it represents. The first of the generic baccalaureate projections (Series A) results in 19,100 graduates by 1999-2000 and 15,200 graduates by 2019-2020. In contrast, the second projection (Series B) results in 26,000 graduates by 1999-2000 and 22,900 graduates by 2019-2020 (see table 10-19).

A second type of baccalaureate program graduates for which projections were developed were post-RN graduates. These are students in baccalaureate programs who are already registered nurses, having taken

their basic education in an associate degree or diploma program, and are subsequently seeking a baccalaureate degree. Post-RN baccalaureate students have been an increasingly higher proportion of total baccalaureate enrollments. This trend is expected to continue throughout the projection period, as more and more graduates from associate degree and diploma programs seek a baccalaureate degree. In 1984-85, there were 5,587 such graduates in addition to 24,975 generic baccalaureate graduates.

These assumptions, coupled with projections of decreases in the size of the population groups from which the nursing students are drawn, led to an overall decline under both Series A and B, in the number of graduates from programs preparing them to become registered nurses. As can be seen in table 10-19, it was projected that for 1999-2000 there would be 66,500 graduates and for 2019-2000, 52,600 graduates (Series A). As can be expected, the sharpest decline in graduates occurred in the diploma programs. By the end of the projection period, diploma graduates would comprise only about 4 percent of the projected total graduates. Under Series A, generic baccalaureate graduates would comprise about 29 percent of the projected total graduates. Thus, about two-thirds of the projected total graduates would be from associate degree programs. Under Series B, generic baccalaureate graduates would comprise about 38 percent of the projected total graduates in 2019-2020 and associate degree graduates would represent 59 percent of the projected total graduates.

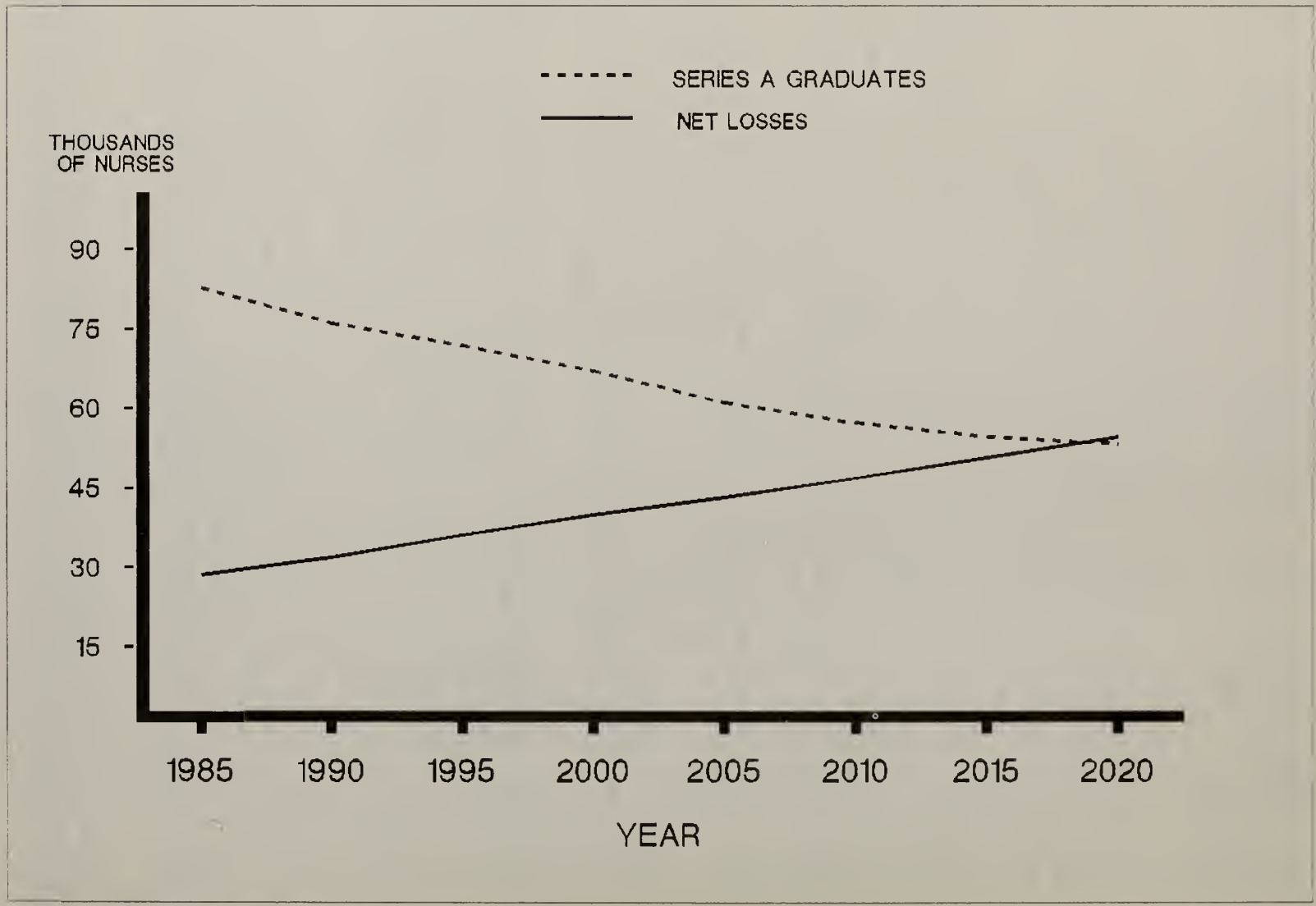
For master's degree programs, it was assumed that the increases in the total number of students noted over the past few years would continue in the future. At the same time, it is anticipated that the proportion of part-time students would continue to grow: to 75 percent by the year 2020. A final assumption that the rate of graduations to part-time enrollments will increase over the years has led to an estimate of 11,700 graduates from master's degree programs for academic year 2019-2020.

Both the licensed practical nurse and registered nurse supply projections are based on assumptions that relate to trends in the behavior patterns of the nurse population. These trends indirectly take into account the labor market in which they are practicing or were entering. In general this has been an expanding market characterized by periodic shortages, particularly of registered nurses. One result of this expanding labor market has been the ability of nurses to temporarily withdraw from the work force and then return as their family or economic conditions warranted.

The 1984 sample survey data for registered nurses, however, suggest that changes may be occurring in employment and licensure patterns. No studies are available on those who drop their licenses; thus no conclusions can be drawn on the reasons for withdrawal from licensure and on the characteristics of those who withdraw. But, from a comparative review of data from the supply model and from the November 1984 study, some analysis of the characteristics can be made.

On an overall basis, it appears that the increased attrition from licensure comes primarily from those who were not employed in nursing and were under the age of 30 or else in their 40s. For both these groups, the

Figure 10-1 PROJECTED GRADUATES AND NET LOSSES FROM THE REGISTERED NURSE POPULATION, 1985-2020



SOURCE: Division of Nursing, BHPr/HRSA, 1987

sample survey estimates of those employed in nursing were not signicantly different from the number that the model would anticipate, although the total nurse population was lower than expected. Nurses in their 30s, on the other hand, appeared to be somewhat more likely to remain licensed than the model would have anticipated and far more likely to be employed in nursing than projections based on the findings of the 1980 sample survey would expect.

The overall review of the 1984 sample survey data in comparison to the other data suggested that the "net loss" curve for registered nurses was approaching a retirement curve; that is, most of the loss from the nurse population coming from the inactive group. However, the overall population of registered nurses will continue to increase as long as new licensees, who primarily come from graduations from nursing educational programs, out-pace losses (mortality, lapsed licenses, etc.,) from the population. It is only when these two converge, that the population of nurses does not increase, and only when they cross, that the population of nurses will decrease. As seen in figure 10-1, annual basic nursing educational graduations will approximate the net losses in 2019 and be less than the losses in 2020 according to Series A assumptions.

The assumption about activity rates to be used, that is the proportion of the nurse population employed in nursing, was derived from the National Sample Surveys of Registered Nurses. In each of the survey years, 1977, 1980 and 1984, the overall activity rate for registered nurses increased. Thus, it would appear that this rate may not as yet have "peaked" and that there was a propensity for those who have licenses to practice to be increasingly inclined toward employment. Therefore, it was assumed that the age-specific activity rates for registered nurses would slightly increase each year, reaching their maximum toward the end of 1990. Variation in the overall rate thereafter would occur because the rates as they are used in the model are "age-specific," and vary as the age distribution of the population changes.

As was true for licensed practical nurses, the age level of registered nurses is also expected to increase over the projection period. While the median age of the registered nurse population was about 39 in November 1984, it is anticipated that it would increase to about 44 by the year 2000 and to about 51 by 2020. A little over half, 52 percent, of the registered nurse population is expected to be 50 years old or older compared to about one-quarter in 1984.

The age level for each of the highest educational level groups within the nurse population also increases over the projection period to about a median age of 53 for those whose highest educational preparation is an associate degree or diploma, 51 for those with baccalaureates, and 46 for those with master's or doctorates. Although baccalaureate-prepared nurses would be expected to be younger on average than the other two groups initially, the median age for these nurses showed the greatest increase within the projection period. This was due to the assumption that increasingly larger proportions of the new baccalaureate graduates would come from the group that entered nursing practice through the associate degree or diploma route and achieved their baccalaureate as a result of post-RN education. The median age of RNs by educational preparation over the course of the model's projections was:

	RN Total	Associate degree and diploma	Baccalaureate	Master's and doctorate
1984	39.0	41.0	33.8	41.8
1990	40.1	42.3	36.0	41.7
1995	42.1	44.1	38.6	41.6
2000	44.2	46.2	41.4	41.7
2005	46.1	48.3	44.1	42.2
2010	47.9	50.1	46.8	43.3
2015	49.6	51.6	49.1	44.6
2020	51.1	53.0	50.9	46.2

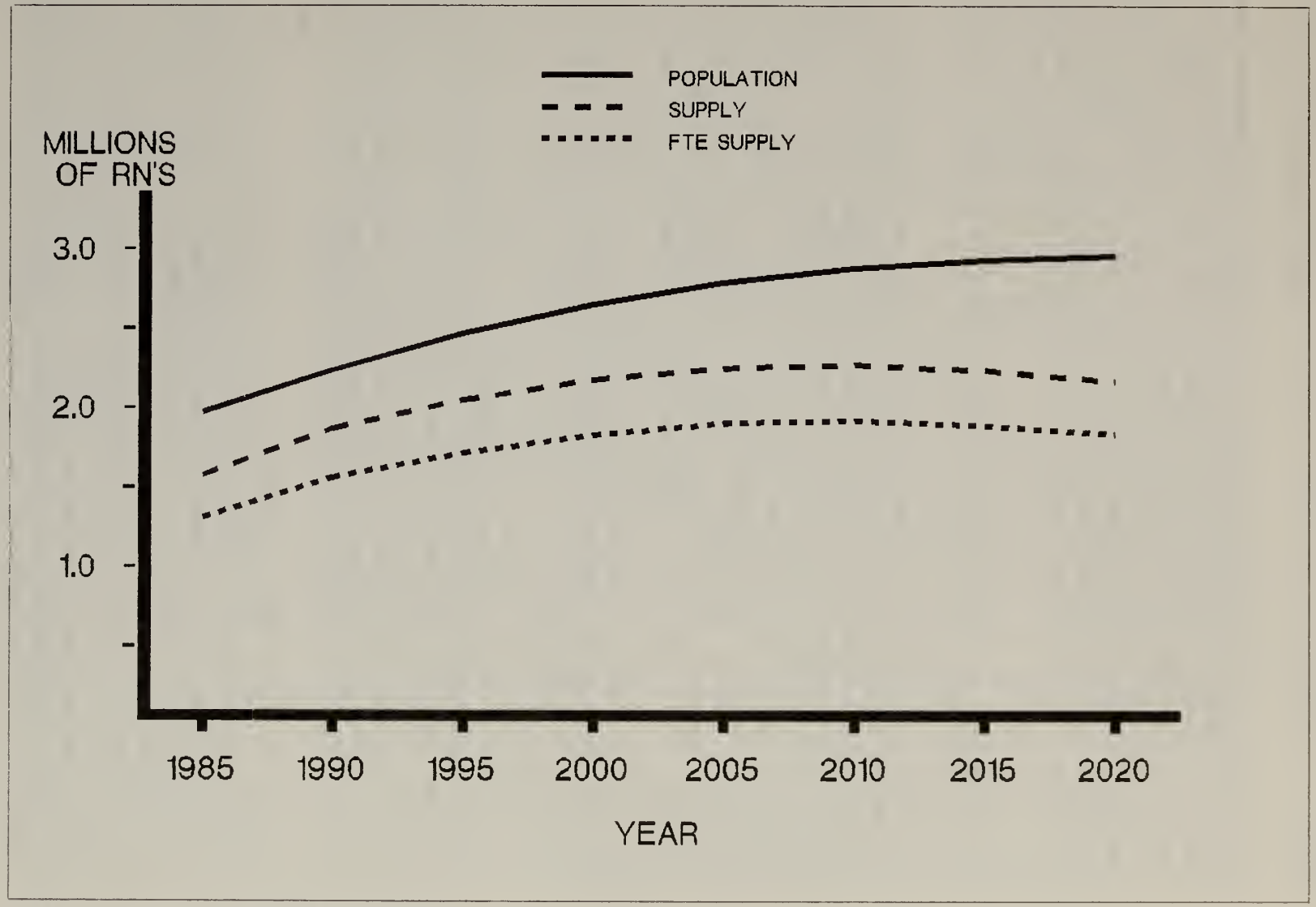
The increase in the age level of the registered nurse population is accompanied by a decline in the activity rates. Although at least three-quarters of the nurse population at each age group level are employed in nursing until the age 55-59 is reached, nurses are most apt to be employed at the youngest age levels. By 2020, it is anticipated that the overall activity rate would be about 73 percent compared to the rate of 78.7 percent in the 1984 study as can be seen below.

	RN Total	Associate degree and diploma	Baccalaureate	Master's and doctorate
1984	78.7	77.1	82.3	81.1
1990	83.5	82.2	86.5	83.4
1995	82.8	81.4	85.5	82.9
2000	81.8	80.4	84.3	82.8
2005	80.6	78.9	82.9	82.6
2010	78.6	76.6	80.6	81.9
2015	76.0	73.8	77.4	80.9
2020	73.0	70.9	73.6	79.3

Based on these assumptions, it is anticipated that the supply of registered nurses employed or available for employment by the end of 2000 (Series A) would be 2,145,000 and by 2020, 2,142,000. Thus, it is expected that the number of nurses in the supply would continue to increase through the end of 2010. By 2020, the supply decreases to the level it was at the end of 2000. However, the registered nurse population continues to increase throughout the projection period, with participation of nurses affected by the increasing age level that influences the overall activity rates (see figure 10-2). The 2,142,000 nurses in the supply projected for 2020 represents a 44-percent increase over the estimated number of nurses in the November 1984 sample survey (see table 10-20). Under Series B, the number of nurses in the supply would be 2,191,400 in 2000 and 2,301,600 in 2020 (see table 10-21).

The largest increase is anticipated for those with at least a master's degree. By 2020, it is anticipated that there would be 348,000 such nurses in the supply, almost quadruple the estimated 91,000 in 1984. Thus,

Figure 10-2 PROJECTED REGISTERED NURSE POPULATION, SUPPLY AND FULL-TIME EQUIVALENT SUPPLY, 1985-2020



SOURCE: Division of Nursing, BHPr/HRSA, 1987

about 16 percent of the supply in 2020 would possess at least a master's degree, in comparison with about 6 percent in 1984 and about 9 percent in 2000.

It is projected that the number of nurses with baccalaureate degrees in 2020 under Series A would be 746,600, an 87-percent increase over the 1984 level, and would comprise about 35 percent of the total supply in 2020. Under the Series B projections, there would be 928,300 baccalaureate-prepared nurses, representing 40 percent of the total supply in 2020. Those whose highest level of preparation is an associate degree or diploma would increase to about 25 percent over the 1984 level by the year 2000 and thereafter decline, to represent only about 49 percent of the total supply in 2020, based on Series A. In 1984 such nurses were about two-thirds of the total supply. Based on the Series B projections, the proportion of associate degree and diploma nurses would represent only about 44 percent of the total supply in 2020.

In examining the registered nurse State-by-State projections, the same cautions indicated for licensed practical nurses should be kept in mind. However, these data provide some interesting insight into the direction of anticipated changes in supply. In both the Series A and B projections, all of the States are anticipated to increase their registered nurse supply by 2000 (see tables 10-22 and 10-23). Only the District of Columbia shows little increase over 1984 in the number of employed registered nurses in 2000. By 2020 the supply of registered nurses actually decreases to near 1984 levels in several States, the most notable of which are Connecticut, Massachusetts, New York and Illinois. Under both Series A and B, the smallest increases in registered nurse supply over the projection period are expected to be the New England, Middle Atlantic, East North Central and West North Central regions. The greatest increases are found in the southern and western parts of the country (see tables 10-24 and 10-25).

The effect of these national assumptions about graduations and the other factors causing change in supply on a State-by-State basis in terms of full-time equivalents are shown in tables 10-26 to 10-29. In general, while it is anticipated that some of the States or regions with lower nurse-to-population ratios would have higher increases than those with higher ratios, fairly wide variation from State to State in both Series A and B, is expected throughout the projection period.

Requirements for Nursing Personnel

Projections of future requirements in this report, as in previous reports to the Congress, are based on two approaches. One, the historical trend-based model, provides a view of requirements in the future based on an extension of past and current trends of services and resource utilization into the future, modified by assumptions about how system changes might impact on these trends. The other, the criteria-based model, examines what requirements might be if judgments of appropriate resources necessary to achieve health care goals were the determinants of requirements in the future.

The Historical Trend-Based Model

The basic structure of the historical trend-based model remains essentially unchanged in its general structure from that reported in prior reports. The model examines requirements for nursing personnel according to the major sectors of the health care system in which these personnel are employed: community hospitals, all other hospitals, nursing homes, community health, physician offices (including health maintenance organizations (HMOs) and prefered provider organizations (PPOs), as well as traditional office based practices), nursing education, and other miscellaneous settings as a group.

Projections are based on trends in three major categories: components of the population, provided services on a per capita basis (inpatient days, outpatient visits, etc,) and numbers of full-time equivalent registered and licensed practical nurses per unit of provided services. A large number of data sources providing information on a national basis and disaggregated to the State level are required to sustain the model and produce the necessary requirements projections. As in the supply model, data collected in the national sample surveys provide the unifying base for the discrete studies of particular aspects coming from other sources. The most current of these are the 1983 National Sample Survey of Licensed Practical/Vocational Nurses and the 1984 National Sample Survey of Registered Nurses. Other data used in discrete studies were gathered principally in 1984 and 1985 and a few in 1986.

The dominant assumption, as indicated by the title given to the model, is that the historical trends will essentially determine the future trends that will occur in the health care system. The validity of such an assumption is dependent on the extent to which the system undergoes modification as a result of self-induced change or influences from external events. The base assumptions made at this time are that the utilization of health care services would maintain established trends; that the rate of RN utilization per provider service would not decrease below current levels; that licensed practical nurse-to-registered nurse ratios would not increase in any major sector and that the recent downtrend in that ratio would be maintained in community hospitals. It is also assumed that licensed practical nurses would not be employed as nurse educators.

The underlying assumptions were modified in those cases where it appears that changes to the health care system have been initiated through cost containment efforts by the health care industry, government and the private sector. The control of costs has seemingly influenced many sectors as a result of the Medicare prospective payment system and Medicaid reimbursement policies, coupled with efforts on the part of the private sector to slow the rate of increase of its health care expenditures. These modifications include a slower rate of growth of new nursing homes beds, a gradual limiting of the registered nurse hours per patient day in community hospitals, and changing organization of physician offices.

Additionally, a review of the subsector behavior within the community health sector itself has revealed that areas of student health and occupational health are growing at a slower rate than exhibited in the past, while the home health area has increased to a noticable degree, both in the number of RNs employed and the amount of services provided. The growth in health maintenance organizations and the rapidly developing preferred provider organizations have together been assumed to increase to a level where 50 percent of the population is covered by such health care entities by the year 2000, with a gradual increase to over 60 percent by the year 2020. Because HMO and PPO members use less inpatient hospital services than nonmembers, any increase in HMO and PPO membership causes a decrease in inpatient hospital resource requirements. The rate of hospital day utilization per HMO or PPO member is currently substantially below that of the nonmembers in HMOs and PPOs. This rate of hospital day utilization per HMO or PPO member was assumed to approach that of the non-member population according to the proportion of the total population that are members. The underlying assumptions coupled with the above modifying assumptions are the basis for the baseline historical trend-based model projections summarized in tables 10-30 to 10-33.

An alternative set of modifying assumptions is strongly suggested by the significant growth that HMOs and PPOs are currently enjoying and which is viewed by many to be the dominant mode of health care in the future ("Currents," 1986). The assumptions of this alternative case are different from the baseline case only in the circumstances applying to HMOs and PPOs. In this case the HMO and PPO enrollments are assumed to continue their early rate of growth beyond 2000, eventually enrolling 90 percent of the total population by 2020.

Further, the increase in the rate of hospital day utilization per HMO and PPO member is assumed to increase only modestly by some 30 percent in 2020, relative to current utilization rates, which will require significantly less inpatient hospital resources than the baseline case. This assumption is assumed to represent the possible result of strict case management of an individual's health care requirements. Observers of and participants in the health care system have already recognized case management as a growing and significant force in health care ("Physician's Groups," 1986; Franklin, 1987).

Further, increasing interest in monitoring rates of illness in conjunction with their associated health resource utilization, cost and quality of care has become evident (Caper, 1987). The effects of such massive application of case management on the remaining sectors of the health care system are certainly not clear, but some of the more obvious ramifications will be addressed in the discussion of the projection results in the following sections. These alternative assumptions form the basis for the case management alternative projections of the historical trend-based model which are also summarized in tables 10-30 to 10-34.

Projections to the Year 2020. The baseline case represents the most likely conditions that will prevail over the projection period given the available evidence to date. The annual projections of the number of full-time equivalent registered nurses required under the "baseline" and

"case management" assumptions differ as a result of the assumptions surrounding the growth of HMOs and PPOs and their hospital utilization rates. The baseline assumptions show the least growth in HMOs and PPOs and the case management assumptions demonstrate the effect of a high growth of these organizations. Therefore, the differences between the baseline and case management assumptions can be interpreted as bounds which delineate a minimum effect of case management (baseline assumptions) and the maximum effect of case management (case management assumptions).

Generally, it is thought that the low utilization rate of hospital days by HMOs and PPOs is accomplished by significantly diminishing the number of admissions to hospitals (Fink, 1986). As current indications are that the length of stay in hospitals is stabilizing, changes in RN requirements would be dependent upon increases in admissions brought about by growth in the general population and, in turn, diminished by the growth in HMO and PPO enrollments. However, as the practice of case management becomes more intense and wide-spread (i.e., moving from the baseline to the case management assumptions), resulting in a decreasing admissions rate to hospitals, then it would seem reasonable that illnesses which had previously reached a level of acuity requiring hospital care would still generate health care needs, but in care settings alternative to hospitals.

This sympathetic increase in nursing requirements in the alternative care settings is not reflected in the case management projections. The provision of care in the alternative settings for those illnesses that no longer require treatment in hospitals would increase the requirements for nurses in those settings specifically, thus elevating the total requirements for nurses above that indicated for the case management assumption. However, at this juncture, there is a paucity of data that can help to quantify the growth of the alternative settings. Although the alternative health care settings may already be in place in the form of home health care, low intensity nursing care facilities, and other ambulatory care facilities, the fraction of the population currently (1985) served by HMOs and PPOs is only somewhat less than 12 percent and, therefore, the impact of increased nursing requirements in these settings is not yet clear.

The number of full-time equivalent RNs required under baseline assumptions in the year 2000 is 1,743,000 and for the year 2020 the requirements become 2,401,700, which represent increases of 38 and 90 percent, respectively, over 1985 requirements, the last year for which provided services data are available (see table 10-30). The requirements for full-time equivalent LP/VNs for these same years are 585,400 and 921,300, which are increases of 18 and 86 percent, respectively.

The requirements for both full-time equivalent registered and licensed practical/vocational nurses increase at a faster rate toward the end of the projection period because the rate of enrollment in HMOs and PPOs does not increase as rapidly as in the earlier portion of the period. Although requirements for RNs increase significantly for all sectors (except nurse educators), this is not the case for LP/VNs (see table 10-31). LP/VN requirements in hospitals decrease to 184,000 in 2000 and 154,100 in 2020. The RN hospital requirements represent increases of 30 and 68

percent in 2000 and 2020 over that of 1985 requirements, while the LP/VN requirements represent decreases of 34 and 45 percent for 2000 and 2020, respectively. However, the increases in requirements for LP/VNs in nursing homes, community health and physician offices offset the decreases projected to occur in hospitals.

The requirements for full-time equivalent RNs in other settings show varying degrees of increase--the highest percentage increase occurring in community health and the lowest in nurse education. The number of required RNs in nursing homes (135,600 and 222,300 in 2000 and 2020, respectively) is less than that of the March 1986 Report to the Congress. The differences are caused by the reduced rate of new bed availability assumed for the present projections. Current assumptions for new nursing home bed availability are approximately one-third of that previously used.

The RN requirements in community health are the result of changes in several different areas of practice, but are affected principally by two areas within community health. The growth in student health and occupational health areas was much reduced from that of past years,and growth in the home health area continues to be robust with sustained increases throughout the projection period. Requirements growth in the physician office sector show an increase which is somewhat less than the prior projections in the last report because of increased HMO enrollments where fewer nurses are used per provided services than in other types of physician offices. Nursing education remains relatively flat because enrollments in schools of nursing trend downward during the projection period. However the enrollments determining these requirements are conservative and any upward trend in enrollments would cause an increase in nurse educator requirements.

The increases in full-time equivalent registered nurse requirements vary according to area of practice. The percentage growth in these requirements for the years 2000 and 2020 relative to the requirements levels in 1985 are summarized below.

	2000	2020
Total	38	90
Hospitals	30	68
Nursing homes	42	132
Community health	75	205
Physician offices	73	110
Educators	2	<1
Other	30	77

The projected requirements for registered nurses under the case management alternative are the same as those for the baseline case except for those sectors--hospitals and physician offices--that are affected by the different assumptions surrounding HMOs and PPOs (see table 10-32). The

requirements for RNs and LP/VNs in hospitals increase less than in the baseline case because there is less hospital utilization due to increased HMO and PPO participation. The RN requirements in physician offices also decreases somewhat more than that of the baseline case because of increased HMO enrollment.

The requirements in hospitals are affected before those of physician offices because the impact of lower HMO and PPO inpatient hospital day utilization rates is felt immediately, while total HMO/PPO enrollments do not increase until after 2000. The relative differences between the two cases are summarized in the table below, where the case management alternative nurse requirements are given as a percentage of the baseline case requirements for 2000 and 2020:

	2000	2020
Total		
RN	95	77
LP/VN	97	91
Hospitals		
RN	92	63
LP/VN	92	72
Physician Office		
RN	100	97
LP/VN	100	85

The projections of national requirements are the aggregate of the projections of requirements of all the States and the District of Columbia (see tables 10-33 and 10-34). Trends for type of each employment setting within each of the States and the District of Columbia are developed. However, the efficacy of these trends depends upon the availability of data that are consistently collected on a national basis and are capable of quantifying performance of the health care system at the State level. In a number of instances, the data employed in the model are based upon sample surveys which afford a wide range of accuracy at the State level of detail. The aggregated State projections are contrasted with projections made at the national level to determine if any significant inconsistencies develop over the projection period. Generally, the total requirements projected by the aggregation of the State level requirements is somewhat higher in 2000 and 2020, but is less than 7 percent above the single national projection. The differences observed in the health care settings within each of the projections is greater, but this is an expected result as loss of accuracy is experienced as progressively smaller populations become the basis for data estimation.

The State projections generally showed a pattern similar to the national results--an essentially sustained growth in requirements throughout the projection period for the baseline case and a slower initial growth and then speeding up toward the end of the projection for the case management

alternative. All States showed increases in requirements under both sets of assumptions with, of course, the growth in the case management alternative being the lesser of the two. The same is true for LP/VNs, but the increases exhibited were significantly less than those of RNs. The regions experiencing the greatest increases in RN requirements were the Mountain and South Central regions; that showing the least was the Middle Atlantic region.

The Criteria-Based Model

Requirements as viewed in the criteria-based model are a measure of the number and levels of educational preparation of nursing personnel needed to meet a particular set of health care goals. The parameters underlying the requirements projections from this model are established by a group of experts. This planning group, using its expert judgment based on a review of past and present practices and experiences, develops the criteria in the form of staffing and service utilization ratios that will best accomplish their health care goals for the country at specific years.

In February 1987, a group consisting of experts from the various types of nursing educational programs, nursing employment sites, and organizations was convened by the Division of Nursing. The group was asked to review and update the previously established criteria for 2000 and to look toward the requirements for 2010 and 2020 given the health care goals and the anticipated health delivery system structure in those years. This 1987 meeting was the fourth time the criteria have been examined since the model structure was established in 1977. The initial Panel of Expert Consultants met in 1977 and considered requirements for the year 1982. Subsequent panels were convened in 1980 and 1984, extending the criteria to the year 1990 and then to the year 2000. The deliberations and results from these earlier reviews were discussed in previous reports.

Assumptions Underlying the Criteria. The 1987 panel maintained the same structure for the criteria and level and titles for nursing personnel as established by the previous panels. They did, however, make particular efforts to examine the potential trends in the utilization of various health care settings and new modes of health care delivery. For example, in the inpatient service areas the criteria were established to take account of the differences in care needs among the patients to be served. In the non-inpatient service areas, recognition was specifically given to such settings for the delivery of care as nurse-managed care centers, health maintenance organizations and preferred provider organizations.

While the panel maintained the level and titles for nursing personnel, they did so within the context of the changes taking place in the uses of nursing personnel and the educational preparation required of nursing personnel. They felt that staffing patterns that include more registered nurses at the baccalaureate and higher degree levels and fewer non-licensed personnel will be further implemented to promote quality care. They saw clinical specialists as increasingly involved in serving as direct care providers in addition to continuing in their roles as consultants, role models, and staff developers. Consistent with this

assumption clinical specialists were primarily incorporated in the requirements as part of the direct client care nursing staff rather than as a separate category of nurse.

The panel saw the trend toward preparing nurse practitioners in graduate programs continuing and, as more schools incorporate the functions and skills associated with the nurse practitioner in the graduate programs, a greater blending of the roles of the clinical specialist and the nurse practitioner. In these criteria, therefore, while they recognized the critical contribution to the delivery of cost effective quality health care of nurse practitioner functions and skills, they felt that as the graduate programs change, there will be no need to differentiate the two titles in the 21st century.

In line with trends in the utilization of licensed practical nurses they assumed that the use of these personnel in institutional settings will continue to decrease through 2000 and be eliminated after that time. For non-institutional settings, licensed practical nurses were assumed to be completely phased out by 2000. Non-licensed personnel, included in the general category of aides in the criteria, would continue to be used. Well-prepared personnel as psychiatric technicians, gero-psychiatric aides, operating room and emergency medical technicians, and school health aides would be needed to assist in the provision of services. Personal care attendants would be required to carry out a wide variety of activities as would ancillary personnel who, while not functioning as direct care providers, provide assistance to nurses.

The 1987 panel, as did the previous ones, stated criteria in terms of upper and lower bounds. The "lower bound" is assumed to be the level all States would achieve while the "upper bound" is the level some States could achieve and others would work toward. As was true for the previous criteria, they were considered as setting directions for the future. It was assumed that variations in staffing patterns and services among the entities within each setting area would continue. The criteria, set at an overall national level, should be considered in the light of State and setting specifics.

Specific criteria were established for each of the three years: 2000, 2010 and 2020. The criteria, both lower and upper bound, for the year 2000 are reported in table 10-35 as illustrative of the type of criteria underlying the projections of requirements from this model.

In establishing the criteria for hospital inpatients, the panel recognized not only the changing nature of the patients, in that most of those admitted would increasingly be more acutely ill and require highly specialized care, but also differences in the acuity levels and the type of care needed. There is a wide difference between critical care units and general units. The amount of care needed by some patients is less than the care provided in critical care units but greater than that available in general units. Based on established scoring systems, some patients are being transferred from critical care to general care too early. Therefore, a new category was added, acute/complex services, as a transition between critical care services and general services.

Critical care encompassed all patients whose conditions were totally unstable, totally nursing care dependent, requiring sophisticated technologies, and thus requiring many hours of care per patient day. Patients requiring acute/complex care were also totally nursing care dependent, medically unstable and labile, and frequently dependent upon sophisticated technologies. They may be in life-threatening situations or in end stages of disease but would need fewer hours of care than critical care patients. Thus, the panel considered the acute/complex care as a "step down" from critical care. General care services would be required for patients who, although sick and with a high intensity of illness, were relatively stable. These patients would no longer be totally nursing dependent but may well still require technologies.

The differentiation in the hours and level of care envisioned among these three care service groups and across the 3 years follow:

	Lower Bound				Upper Bound			
	Nursing hrs. per patient day	Percent distribution of nursing staff			Nursing hrs. per patient day	Percent distribution of nursing staff		
		RN	LPN	Aide		RN	LPN	Aide
Critical care								
2000	18.0	100	--	--	24.0	100	--	--
2010	20.0	100	--	--	26.0	100	--	--
2020	22.0	100	--	--	24.0	100	--	--
Acute/complex care								
2000	12.0	100	--	--	14.0	100	--	--
2010	14.0	100	--	--	16.0	100	--	--
2020	14.0	100	--	--	18.0	100	--	--
General care								
2000	5.5	70	10	20	6.5	80	5	15
2010	6.0	80	--	20	7.5	80	--	20
2020	7.0	80	--	20	8.5	80	--	20

In the nursing home area, the panel recognized the broad array of care needs of the residents in establishing the criteria for requirements. They categorized the resident population into three functional areas of dependency. In defining each level, they emphasized that, regardless of classification, 60-70 percent of the residents exhibit behavior problems requiring nursing intervention. Restorative care, included in each of the levels, may not be necessary for all residents.

Residents classified in the "functionally assisted" category were assumed to need minimal nursing care but to require assistance in one or more of the activities of daily living. Many of these residents would be frail

and chronically ill, some with behavioral problems, and all would be medically stable. It was assumed that fewer of these would be residing in nursing homes in the future and that residents within this classification would decrease from 30 percent of the total residents in 2000 to 10 percent in 2020.

The majority of the residents in nursing homes would be classified in the "functionally dependent but stable" category. Included among these would be the frail and chronically ill with multiple diagnoses, and the mentally impaired. Residents in this category, because of multiple dependencies, require more care than those in the "functionally assisted" category but the type of care is similar. In both cases, registered nurse coverage is required to manage care, observe changes, and perform interventions, in order to maintain or improve current health status.

The third classification, "functionally dependent with complex needs" included residents who were relatively stable but, although discharged from hospitals, were still acutely ill and required technologies such as ventilators and special feedings. Also included were the medically fragile, those continuing to be dependent on technologies, individuals beginning long-term rehabilitation, and the terminally ill. The panel saw this group as an increasing proportion of the total residents in nursing homes in the future, 10 percent by the year 2000 and 17 percent by 2020.

The nursing care hours required for residents who were functionally dependent with complex needs would be the same as those required by patients in the general care category in hospitals, with most of the care being provided by registered nurses who would be assisted by aides. The nursing care hours for the other two categories would be somewhat less than those for the first, with the majority of the care being provided by aides. In 2000 proportionately more licensed practical nurses than registered nurses would be involved in providing care for the residents in these two categories. Thereafter the caregivers would be registered nurses and aides.

The panel considered that the number of persons cared for in noninstitutional-based areas would continue to increase and that many of the clients would require complex nursing care. Given the acuity level of the clients and the care environment, nurses would require preparation to function independently, make sound judgments, and be critical thinkers. The panel's assessment of the care needs in these areas was in general agreement with that of prior panels. They saw home health visits as encompassing care of those newly discharged from hospitals and of post-ambulatory surgery patients requiring sophisticated, complex care; disabled persons; elderly with complex chronic care needs; and high risk groups for health promotion/disease prevention. Nurses in these instances would be providing care to individuals and families with acute and chronic health problems and to those receiving rehabilitation, hospice, and respite care.

The panel took specific notice of the changing structure of physician office-based care and of additional care needs in the case of such groups as those with AIDS. They recognized that changing societal needs are reflected in increased requirements for home health visits due

to more teenage pregnancies, births to drug-addicted mothers and to mothers with AIDS, and assistance required for preschoolers in families with economic levels up to 150 percent of poverty level. In the school health area, the panel recognized the need to provide health services to students in colleges and universities, and the need for school health aides to assist the student population.

In considering the requirements for nurse faculty members, the panel developed criteria consistent with their ideas about 21st century nursing educational facilities by establishing criteria for faculty for registered nurse programs in associate degree, baccalaureate and higher degree schools. Due to educational costs, they felt that different approaches would be developed to teaching and supervision of students. Nurses in various clinical settings are contributing to education of students by serving as preceptors. As the number of nurses prepared at the baccalaureate and higher degree levels increases, more nurses will be available for the implementation of innovative clinical teaching strategies (Kearns, 1987).

Projections to the year 2020. Since the panel concerned with establishing the criteria upon which the requirements projections rest do so within consideration of particular goals for a particular point in time, annual projections within the intervening years would not be appropriate. Thus, projections of requirements for the future, using the criteria-based model, are expressed only for the specific years under consideration when the criteria were set.

Based on the criteria established for each of the years and the underlying assumptions made by the panel for the distribution of patients in inpatient services according to types of nursing care needed (as shown in table 10-36), the following overall projections of full-time equivalent nursing personnel would be required in each of the years:

	Lower bound	Upper bound
2000		
Registered nurse	1,816,900	2,269,100
Licensed practical nurse	291,700	289,900
Aide	1,072,200	1,347,100
2010		
Registered nurse	2,711,100	3,242,800
Licensed practical nurse	------	------
Aide	1,200,400	1,546,300
2020		
Registered nurse	3,431,800	4,107,500
Licensed practical nurse	------	------
Aide	1,460,000	1,841,500

As part of the criteria, the panel distinguished among the levels of educational preparation required of the registered nurse to appropriately carry out the functions encompassed in the position to be filled. The distribution of the full-time equivalent registered nurse positions by educational preparation as required under assumptions developed in the criteria-based model follows:

	Lower bound		Upper bound	
	Number (thousands)	Percent	Number (thousands)	Percent
2000				
Total	1,817	100	2,269	100
AD/diploma	586	32	585	26
Baccalaureate	854	47	1,173	52
Master's	355	20	482	21
Doctorate	22	1	30	1
2010				
Total	2,711	100	3,243	100
AD/diploma	794	29	811	25
Baccalaureate	1,385	51	1,692	52
Master's	509	19	706	22
Doctorate	23	1	33	1
2020				
Total	3,432	100	4,108	100
AD/diploma	855	25	935	23
Baccalaureate	1,754	51	2,170	53
Master's	796	23	965	23
Doctorate	26	1	38	1

In line with the panel's assumptions that clinical specialists will be found in increasing numbers as direct care providers, at least 6 out of 10 of the full-time equivalent registered nurses with master's degrees would be required as direct care providers in 2000; 215,000 in the lower bound and 307,000 in the upper bound. By 2020, the proportion of the master's degree full-time equivalent nurses who would be direct care providers rose to almost 8 out of 10, 620,000 in the lower bound and 753,000 in the upper bound. As mentioned previously, on the assumption that by the 21st century educational programs preparing master clinicians would have incorporated preparation for both specialists and practitioners, no differentiations were made between these direct care providers with master's degrees as to whether they would be clinical specialists or nurse practitioners. Rather, it was assumed that the two roles would be combined in the type of care provided by these individuals.

Of interest, as well, in review of the requirements for nurses by educational preparation, is the very slight change in the requirements for doctorally prepared nurses by the year 2020. Of primary interest here is the influence of the nursing education area, where the majority of nurses

with doctorates are concentrated. The projections of requirements for the nursing education area are based on the assumptions of a declining student body. If the student body was increased significantly, the requirements for teaching the increased student body, while not having a major impact on the overall numbers of full-time equivalent registered nurses, would have a major effect on the number of those requiring doctorates.

Requirements for each field of nursing for the 3 years can be found in table 10-36. Overall projections for each State for the years 2000 and 2020 appear in tables 10-37 to 10-39.

A Comparative Review of Projections for the Future

The various projections included in this section provide a review of what might pertain in the future for the availability of licensed nursing personnel to meet the requirements for such personnel from a number of different perspectives. As the data show, the conclusions drawn are based not only on the available information upon which the projections rest but also the assumptions made about changes that may or may not occur over time.

The two approaches taken to projecting requirements are fundamentally different. The historical-trend based model's view of the future is governed by past utilization. While to some extent, system changes in the future are recognized through the assumptions made, the impact of these evolve out of past trends. This report presents two pictures from the historical trend-based model of where present trends might lead in the future; the "baseline" and one which projects a more rapid movement toward revisions in the way health care is delivered, "case management".

Requirements projections from the criteria-based model, on the other hand, rely on judgments made by an expert group as to what would be the most appropriate use of resources to accomplish their established health care goals. While to some extent, past and current trends are taken into account as part of the considerations of the expert group, the results are not governed by these trends if the goals suggest changes in approach or direction. Here, too, two sets of projections were made; the "lower bound" reflecting a level which the group anticipates that all States will achieve and the "upper bound" for which it is assumed that some States could achieve and others would strive toward.

Two sets of projections of available resources are also shown. In both instances, they are based primarily on trends noted, modified by assumptions of where those trends might lead in the future. The "Series A" projections for registered nurses take into account the most current data produced by the American Association of Colleges of Nursing regarding first-time enrollments in the Association's member schools, while "Series B" projections present a continuation of trends evidenced in the past and include the latest complete data available at the time the projections were made. In essence, then, the Series A projections represent a more constrained view of the numbers of basic baccalaureate graduates and their impact on the registered nurse supply than do the Series B projections. For licensed practical nurses, the report presents one set of projections of the supply based on the trends noted in the latest data available on the group.

Before examining the effect of these various views of the future supply of and requirements for registered nurses, a summary of the results of the conclusions should place these data in perspective. The following provides such a summary showing the anticipated number of graduates and the full-time equivalent supply of and requirements for registered nurses for the years 2000, 2010, and 2020:

	2000	2010	2020
Graduations			
Series A	66,500	56,600	52,600
Series B	73,400	64,900	60,300
Supply (FTE)*			
Series A	1,799,000	1,890,500	1,806,400
Series B	1,840,100	1,980,800	1,945,300
Requirements (FTE)			
Historical trend-based			
Baseline	1,743,000	2,022,300	2,401,700
Case Management	1,650,500	1,733,200	1,860,970
Criteria-based			
Lower bound	1,816,900	2,711,100	3,481,800
Upper bound	2,269,100	3,242,800	4,107,500

*Subsequent to the development of these supply projections, the National League for Nursing produced a preliminary estimate of the total graduates of 77,000 for the academic year 1985-86, less than the projected estimate used. To evaluate the effect of the decrease in the graduates along the lines indicated by this estimate, the projections were modified to take this into account. The resultant projections of the full-time equivalent supply of registered nurses were for 2000, 1,757,600; for 2010, 1,831,000, and for 2020, 1,736,400.

As can be seen from these data, in the year 2000 the overall requirements for full-time equivalent registered nurses roughly approximates the overall full-time equivalent registered nurse supply. The lowest projection, the "case management" historical trend-based requirements, is considerably below the supply projections. However, here it is important to bear in mind that those projections do not take account of requirements that will undoubtedly be generated for nurses in noninstitutional-based settings resulting from further constraints on hospital patient days envisioned by those projections.

On the other hand, the "upper bound" projections from the criteria-based model for the year 2000 are considerably higher than the projections of the supply available. In this instance, it is important to recognize that the upper bound is set at a level which becomes a goal for all States with the anticipation that some of the States would achieve the level by the date indicated. The projection for the upper bound provided here assumes that all States will have achieved the indicated criteria by 2000.

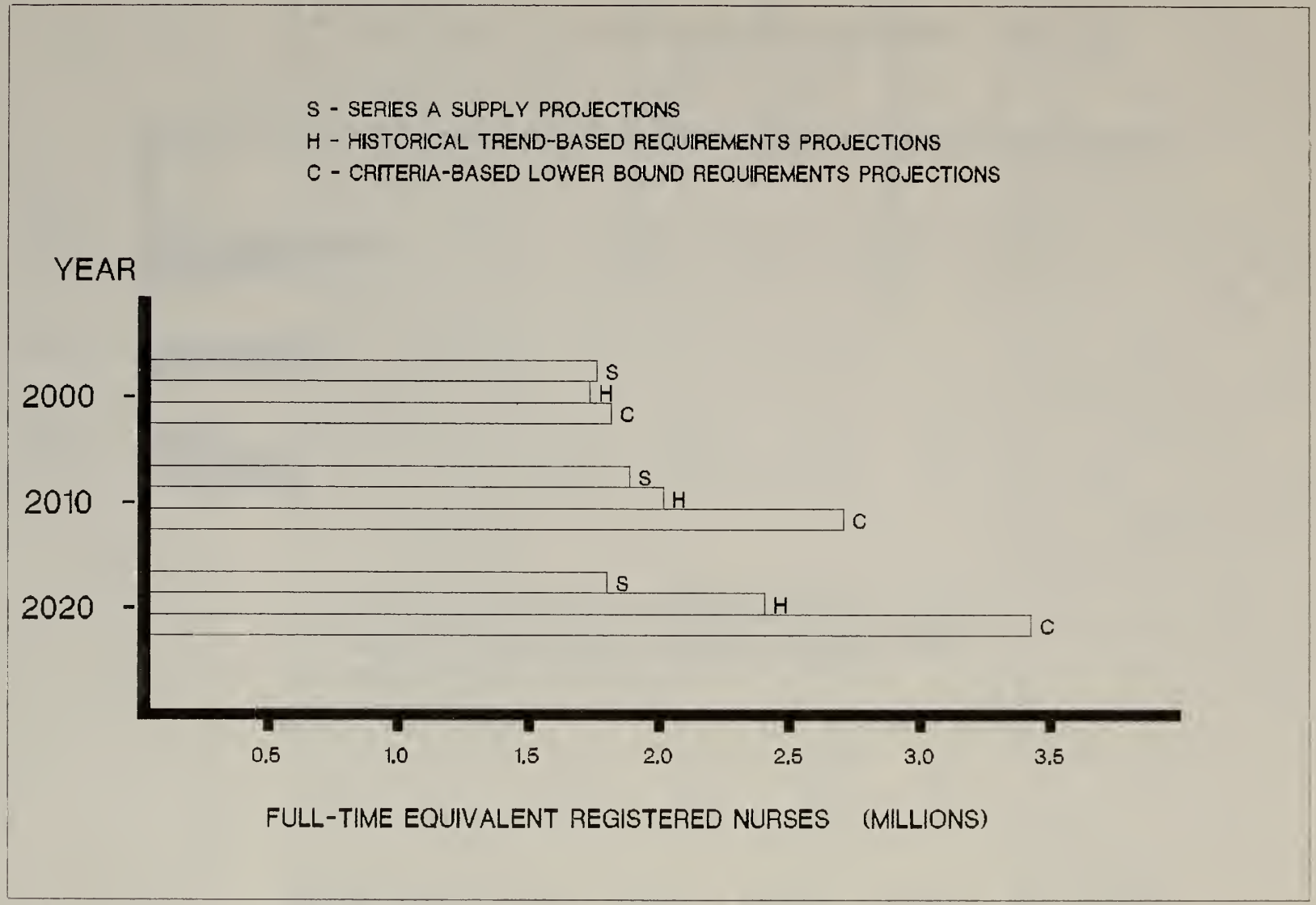
Since the "Series A" supply projections take into account the latest possible data on graduations and because the "case management" projections can only be considered a lower limit and the "upper bound" projections an upper limit, further comparisons are based on the Series A supply projections, the baseline historical trend-based projections, and the lower bound criteria-based projections as pictured in figure 10-3. That figure illustrates the increasing gap between the full-time equivalent supply of registered nurses and the requirements for these personnel as the years progress in the 21st century.

Although the criteria-based model requirements are stated only for the three specific dates, both the supply projections and the historical-trend based model projections are presented on an annual basis. A comparison of the data in tables 10-21 and 10-30 shows that the turning point starts in 2006. From that time, the requirements for full-time equivalent registered nurses tend toward an increasingly higher level than the full-time equivalent supply of registered nurses. The significant projected decline in the overall number of graduates from basic nursing education under the Series A assumptions (the prime source of new inputs into the nurse supply) coupled with the continuing increase in the age level of those already part of the registered nurse population result in a reversal of the increase in the projections of the full-time equivalent supply of registered nurses starting in 2011. The requirements from the historical trend-based model continue to increase primarily as a result of the increase in the number and the age level of the general population. Thus, by the year 2020, requirements as measured by the historical trend-based model baseline assumptions are about 25 percent higher than the full-time equivalent Series A supply projections.

Figure 10-4 also shows an increasing gap between the full-time equivalent registered nurse requirements as measured by the historical-trend based model and the criteria-based model. To some extent, this reflects differences between the results using judgments as to the best use of nursing resources in providing an appropriate level of health care to the population and trends in the utilization of nursing resources and health care. However, as can be seen in figure 10-4 the impact of the inclusion of licensed practical nurses as part of the licensed nursing team reveals little difference between the two sets of projections. The historical trend-based model took into account current employment patterns for licensed practical nurses and, although the assumptions did see some modification in their use, the presence of LPNs on the nursing team was continued throughout the projection period.

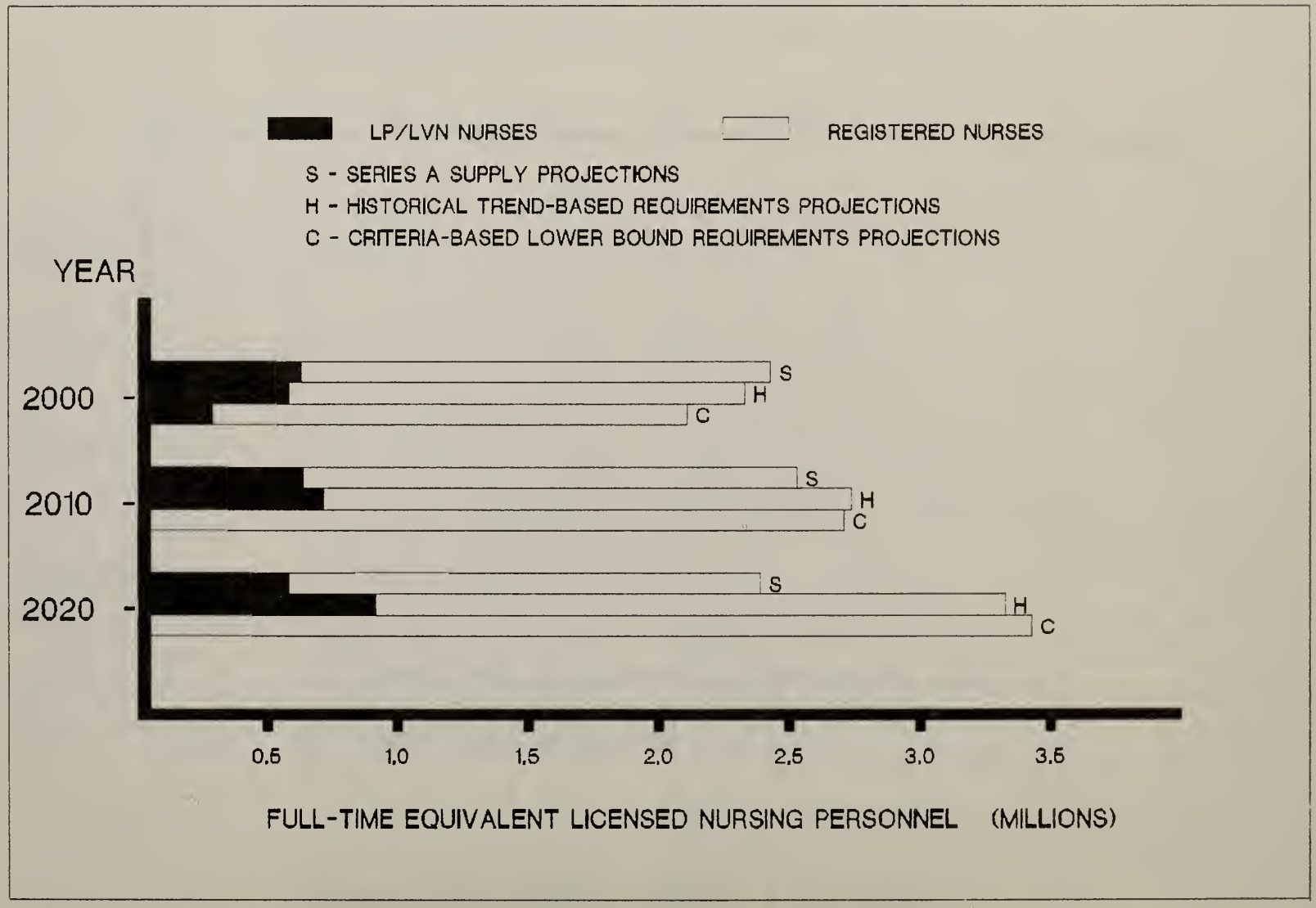
As indicated earlier, the expert panel reviewing the criteria saw a major change in the use of licensed practical nurses. By the year 2000, these nurses would only be employed in institutional settings, and by 2010, they would be phased out. The nursing care hours that LPNs provided were mainly shifted toward those provided by registered nurses rather than toward the aide category. The extent of practical nurse utilization in the future will have a major impact on both the educational distribution of the supply and the requirements. However, both requirements projections models result in the same conclusions: requirements outpace

Figure 10-3 PROJECTIONS OF SUPPLY AND REQUIREMENTS FOR FTE RN'S: 2000 TO 2020



SOURCE: Division of Nursing, BHPr/HRSA, 1987

Figure 10-4 PROJECTIONS OF SUPPLY AND REQUIREMENTS FOR FTE RN'S AND LPN'S: 2000 TO 2020



SOURCE: Division of Nursing, BHPr/HRSA, 1987

supply. As time progresses in the 21st century, a wider gap between supply and requirements for licensed nursing personnel occurs.
Concerns about the availablility of nursing personnel center around not only the overall number of such personnel available but also the qualifications of these individuals to adequately carry out their nursing responsibilities. One measure of these qualifications is the educational preparation they have for the position since the ability to function in a position rests on both the theoretical framework and background they have for the position and the particular experience and knowledge acquired through such experience. Unlike the criteria-based model, the historical trend-based model does not distinguish among the various types of educational preparation required for registered nurse positions. Therefore, in the following summary of full-time equivalent supply and requirements projections, Series A supply projections and the lower bound criteria-based model requirements projections are displayed:

	2000	2010	2020
Associate degree/diploma			
Supply	1,027,500	983,500	856,100
Requirements	586,000	794,000	855,300
Baccalaureate			
Supply	596,600	656,500	635,500
Requirements	853,800	1,385,300	1,754,300
Master's and doctorate			
Supply	174,900	250,400	314,900
Requirements	377,100	531,800	822,200

As can be seen, these data indicate that the imbalances between the supply and requirements noted for the future occur for registered nurses with baccalaureate and higher degrees. While the projected supply of associate degree/diploma nurses is significantly higher than the requirements for the year 2000, by 2020 the supply and requirements are about equal. Requirements for baccalaureate graduates, however, in the year 2000 are 43 percent higher than the projected supply. By 2020, the requirements were almost three times higher than the supply. For nurses with graduate degrees, the requirements were almost three times higher than the supply for all 3 years.

These requirements reflect the criteria the expert panel developed in relation to their judgment of the appropriate qualifications to carry out the health care goals they envisioned. It is important to note, though, in this connection, that while the historical trend-based model does not explicitly take into account the educational preparation of the nurses, that model, as did the criteria-based model, did project a significant increase in the requirements for nurses in non-inpatient settings. This would have a direct bearing on requirements for nurses with baccalaureate degrees since it is in the baccalaureate programs where students are prepared to function in community settings as well as in institutional facilities.

The panel developing the criteria also saw an important role for the master's- prepared clinician as a direct care provider. Thus, those with graduate degrees would serve a number of key roles in the health care system through the provision of the 1) leadership necessary for effective nursing care; 2) education for those already in the nurse population to maintain and upgrade their skills and for those entering the profession; and 3) expert assistance and primary care to assist the general population to maintain and attain appropriate health status.

Conclusions and Recommendations

Although the nurse supply is increasing, there is at the same time a decrease in enrollments in nursing educational programs and inability on the part of many hospitals, nursing homes, and other employers to obtain a sufficient number of qualified registered nurses. The latest estimates of the supply of registered nurses reflect an all time high due, in a large measure, to the unprecedented growth in enrollments in basic nursing education programs across the Nation during the mid-1970s. One of the factors affecting this growth was Federal support for nursing education that included capitation grants. Annual graduations now are about double the annual graduations prior to the award of capitation funds. The latest data available show that a high proportion of registered nurses are employed in nursing positions; about one-third work part time. The studies also show that a high proportion of nurses tend to remain in the nursing work force.

Hospitals, traditional employers of approximately two-thirds of registered nurses, report major shortages in their registered nurse staffs. The shortage of registered nurses in hospitals may be explained in part by the tremendous changes in hospital-based practice, particularly the dramatic change in the profile of the hospital population. Patients are hospitalized for shorter periods and only for the most acute days of the illness, so that overall, the severity of illness of hospitalized patients has increased, and the skill level and quantity of nursing care required has correspondingly increased. Among the various age groups, the largest single proportion of patients in acute care hospitals are those over 65 years of age, who frequently have multiple complex health problems. Further, much of the care is delivered to critically ill patients, and requires that care be based on broad, scientific knowledge for accurate clinical judgments. Nursing personnel must also have expert clinical skills and be well oriented to the newest technological devices. The number of lesser skilled nursing personnel employed in hospitals has shown a marked decline while the number of registered nurses has increased.

Early discharge of patients from hospitals has dramatically increased the need for home health services. Community nursing services are providing expanded and highly technical care to home-based clients. Although more recent data than 1984 are not available on nurses employed in home health care, opportunities for employment of registered nurses in community-based nursing programs have increased, and may also be affecting the supply of registered nurses available for hospital employment.

A variety of strategies are under way within both the public and private sectors to better cope with the current concerns about the availability of a sufficient nurse supply. The Congress has provided funds for studies related

to nurse shortage and nurse retention issues. The Department has taken several steps, working with public and private sector organizations, to address the issue:

- In September 1987, the Secretary convened a workshop on nursing to hear from key health care professionals and care delivery organizations about the current and future nursing situation.

- A Commission on Nursing has been appointed by the Secretary to assess the nature and extent of the nursing shortage, and to recommend actions which can be taken by both private and public sectors to address shortage-related issues. The Commission, consisting of leading representatives from nursing and the health care delivery system, will present a final report to the Secretary in December 1988. An interim report describing the current situation will be submitted in June.

- The Secretary's Commission will focus on the current imbalance between supply and demand in the economic sense, an endeavor different from the requirements models of this report.

- Since some observers believe that Federal health care financing policies--particularly prospective payment for hospitals--impact on the nursing situation, the Secretary has asked the two major health agencies, the Health Care Financing Administration and the Public Health Service, to examine the relationship between Medicare reimbursement and nursing shortages.

- The nursing student loan program which provides loans at reduced interest rates for nursing students of exceptional financial need will be continued. A sum of $10 million was recently redistributed to new and existing schools in need of additional loan capital. In total, approximately $18 million is available for nursing student loans.

- The Department is continuing to conduct research and collect data on nursing issues. For example, in 1987 the Health Resources and Services Administration awarded two contracts, the first for a national sample survey of registered nurses to update data on registered nurse supply and distribution, and a second to convene an invitational workshop on nursing shortage issues, particularly those concerning education and practice. The National Center for Nursing Research is supporting research on nursing resources and retention. The Health Care Financing Administration has funded studies which examine the relationship between nursing care requirements and Diagnostic Related Groups.

The data on projections contained in this report show that the supply of and requirements for registered nurses taken as a whole throughout the country would not be seriously out of balance in the year 2000. However, distributional imbalances of registered nurses in local and regional geographical areas and in some selected or specialty areas of practice currently exist and may continue into the future. Projections of nurse supply for the 21st century indicate that the situation remains somewhat the same through the first decade. In the second decade, however, the situation reverses itself. Declining graduations and a marked increase in age level of the registered nurse population contribute to the projected decrease in the overall supply.

Throughout the projection period, as also noted in the earlier congressional reports, there is a significant imbalance between the supply of and requirements for those nurses with baccalaureate and higher degrees. The data in this report reflect a full-time equivalent supply of baccalaureate and higher degree nurses that is one-third the requirement for such nurses by 2020.

Since the intent of the models from which the projections were drawn is to look toward the future, no attempt has been made in this analysis to examine current requirements, as measured by the current employer demand, in relation to the current supply. Data of relevance to this current situation were explored in the earlier sections of this chapter. The projections provide a long range perspective, thus assisting with the study of appropriate steps to be taken to assure the availability of nursing personnel in sufficient numbers and appropriately qualified to provide effective health care to the population.

The extent to which the conclusions resulting from the projections will pertain in the future needs to be considered within a number of uncertainties. With regard to nursing personnel, such areas as the nurses' decisions about remaining in the work force and potential students' decisions about entering nursing would have a material effect on the conclusions drawn here about the future nurse supply. Continual declines in the number of graduates, while not initially causing a decline in the overall supply, would eventually lead to such a decline since there would be insufficient replacements for aging nurses leaving the work force.

On the other hand, changes in the health care system itself and in the utilization of nursing personnel within the system would materially affect the requirements for nursing personnel. Based on an examination of past trends and current conditions, however, there appears to be an increased use of more highly skilled nursing personnel in caring for the population. Also, the increasing age level of the population coupled with the growth of the population would seem to lead toward increased requirements for health care, although the type of care may be governed by improved measures of health promotion and disease prevention and the determination of more effective means of delivering such care.

To summarize this report's findings, it is evident that at the present time there is an increased demand for registered nurses in hospitals along with problems of recruitment and retention. While settings in which nurses are employed other than hospitals have not been the subject of discussion about shortages in the same way hospitals have, data have shown chronic deficits in skilled nursing personnel in nursing homes. Although comprehensive data are not available for the home health area, this area is not experiencing as much of a problem as the other two health care areas. Indications for the future show that educational programs preparing individuals for practice as registered nurses face declines in enrollments. It is also anticipated that there will be a decline in the participation in the nurse work force brought about by the increasing aging of the nurse population. The numbers of new graduates and the activity rates are two major factors affecting supply. Thus, by 2010, it is expected that requirements will exceed the supply available. The supply of baccalaureate and higher degree nurses, however, falls short of the requirements throughout.

The data reflect the importance of the need for the Federal Government to continue to assess the availability of nursing personnel through the collection and analysis of timely data on all nursing personnel, both registered nurses and licensed practical nurses; their characteristics as current and potential members of the health care work force; the nursing educational system; and nursing practice in order to make appropriate policy decisions critical to the assurance of quality health care delivery to the Nation.

The data reflect, as well, the need for a number of national initiatives to respond to the problems and issues identified. The specific problems of the acute care settings require national attention in developing ways of dealing with current nursing employment situations to prevent continuing, long-range stress in this area.

A national initiative is needed to address the problem of declining nursing school enrollments. Continuing enrollment declines noted in nursing and in other health care professions raise concerns about the ability to replenish and augment the supply of nurses, thus causing an aging nurse population and shortages as we progress into the 21st century.

Continuing national initiatives are required to ensure the appropriate preparation of nurses. Current health care needs, as well as the changes in the population of the country and the changing locus of the settings in which health care is delivered, require that there be an adequate number of nurses prepared to provide and manage care in a variety of settings, and to serve as expert clinicians, teachers, administrators, researchers and consultants.

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TABLE 10-1. EDUCATIONAL PROGRAMS PREPARING REGISTERED NURSES IN THE UNITED STATES, 1975-76 to 1985-86

Academic year	Programs[1]	Enrollments[1]	Admissions[2]	Graduations[2]
TOTAL:				
1975-76	1,362	248,171	112,174	77,065
1976-77	1,358	247,044	112,523	77,755
1977-78	1,356	245,390	110,950	77,874
1978-79	1,358	239,486	107,476	77,132
1979-80	1,374	234,659	105,952	75,523
1980-81	1,385	230,966	110,201	73,985
1981-82	1,401	234,995	115,279	74,052
1982-83	1,432	242,035	120,579	77,408
1983-84	1,466	250,553	123,824	80,312
1984-85	1,477	237,232	118,224	82,075
1985-86	1,473	217,955	(3)	(3)
ASSOCIATE DEGREE:				
1975-76	608	88,121	52,232	34,625
1976-77	632	91,004	53,610	36,289
1977-78	645	91,102	52,991	36,556
1978-79	666	91,527	53,366	36,264
1979-80	678	92,069	53,633	36,034
1980-81	697	94,060	56,899	36,712
1981-82	715	100,019	60,423	38,289
1982-83	742	105,324	63,947	41,849
1983-84	764	109,605	66,576	44,394
1984-85	777	104,968	63,776	45,208
1985-86	776	96,756	(3)	(3)
DIPLOMA:				
1975-76	428	60,213	23,622	19,861
1976-77	390	56,091	22,243	18,014
1977-78	367	52,858	20,611	17,131
1978-79	344	48,059	18,499	15,820
1979-80	333	43,651	16,905	14,495
1980-81	311	41,048	17,494	12,903
1981-82	303	41,009	18,928	11,682
1982-83	288	42,348	19,368	11,704
1983-84	281	42,007	17,848	12,200
1984-85	273	37,256	14,875	11,892
1985-86	256	30,179	(3)	(3)
BACCALAUREATE:[4]				
1975-76	326	99,837	36,320	22,579
1976-77	336	99,949	36,670	23,452
1977-78	344	101,430	37,348	24,187
1978-79	348	99,900	35,611	25,048
1979-80	363	98,939	35,414	24,994
1980-81	377	95,858	35,808	24,370
1981-82	383	93,967	35,928	24,081
1982-83	402	94,363	37,264	23,855
1983-84	421	98,941	39,400	23,718
1984-85	427	95,008	39,573	24,975
1985-86	441	91,020	(3)	(3)

[1]As of October 1 of each year.
[2]Time period for the academic year is August 1 through July 31.
[3]Data not available.
[4]Includes programs and students in generic master's and doctoral programs, where such are in existence.

SOURCE: National League for Nursing, Nursing Student Census, 1985, and unpublished data.

Table 10-2. PRACTICAL NURSING EDUCATIONAL PROGRAMS AND STUDENTS IN THE UNITED STATES, 1975-1976 to 1984-1985

Academic year	Programs[1]	Enrollments[1]	Admissions[2]	Graduations[2]
1975-76	1,315	58,460	61,353	47,145
1976-77	1,318	58,423	60,166	46,614
1977-78	1,319	56,943	60,610	45,350
1978-79	1,310	54,543	57,081	44,235
1979-80	1,298	52,202	56,316	41,892
1980-81	1,299	52,565	58,479	41,002
1981-82	1,309	55,024	60,426	43,299
1982-83	1,295	57,367	61,453	45,174
1983-84	1,297	55,446	57,865	44,654
1984-85	1,254	48,840	(3)	(3)

[1]As of October 15.
[2]Time period is from August 1 through July 31.
[3]Data not available.

SOURCE: National League for Nursing, NLN Nursing Data Review 1985, and unpublished data.

Table 10-3. ADMISSIONS TO AND GRADUATIONS FROM NURSING EDUCATIONAL PROGRAMS PREPARING REGISTERED NURSES, BY TYPE OF PROGRAM AND GEOGRAPHIC AREA, 1984-1985

Geographic area	Admissions				Graduations			
	Total	Baccalaureate[1]	Associate Degree	Diploma	Total	Baccalaureate[1]	Associate degree	Diploma
United States	118,224	38,573	63,776	14,875	82,075	24,975	45,208	11,892
New England	7,338	3,146	3,070	1,122	5,233	2,014	2,155	1,064
Connecticut	1,372	520	535	317	1,003	359	377	267
Maine	650	329	238	83	372	144	189	39
Massachusetts	3,558	1,388	1,570	600	2,736	1,032	1,055	649
New Hampshire	523	161	316	46	383	142	203	38
Rhode Island	962	646	240	76	521	262	188	71
Vermont	273	102	171	--	218	75	143	—
Middle Atlantic	23,356	7,124	11,512	4,720	14,565	4,428	6,871	3,266
New Jersey	4,016	1,168	1,538	1,310	2,010	387	1,026	597
New York	12,601	3,627	8,036	938	7,114	2,166	4,278	670
Pennsylvania	6,739	2,329	1,938	2,472	5,441	1,875	1,567	1,999
South Atlantic	19,054	6,120	11,540	1,394	13,294	3,666	8,483	1,145
Delaware	416	209	187	20	334	180	146	8
District of Columbia	628	508	120	—	352	293	59	—
Florida	4,269	994	3,144	131	3,272	630	2,505	137
Georgia	2,953	925	1,890	138	1,731	467	1,159	105
Maryland	2,313	772	1,226	315	1,490	404	897	189
North Carolina	3,007	779	1,960	268	2,598	663	1,719	216
South Carolina	1,587	778	803	6	901	264	608	29
Virginia	2,588	856	1,325	407	1,745	594	796	355
West Virginia	1,293	299	885	109	871	171	594	106
East South Central	10,178	3,698	5,605	876	6,364	2,010	3,701	653
Alabama	3,074	1,367	1,584	123	2,094	955	1,029	110
Kentucky	2,180	612	1,568	—	1,325	229	1,096	—
Mississippi	1,825	638	1,187	—	1,033	337	670	26
Tennessee	3,099	1,081	1,266	753	1,912	489	906	517
West South Central	9,901	3,766	5,469	666	6,209	2,332	3,475	402
Arkansas	1,143	313	661	169	778	185	509	84
Louisiana	2,062	996	713	353	939	401	344	194
Oklahoma	1,182	428	754	—	840	306	534	—
Texas	5,514	2,029	3,341	144	3,652	1,440	2,088	124
East North Central	22,889	7,224	11,811	3,854	16,857	4,915	8,762	3,180
Illinois	5,881	1,603	3,142	1,136	4,299	1,171	2,260	868
Indiana	3,055	1,224	1,365	466	2,131	739	1,098	294
Michigan	4,820	1,301	3,155	364	3,552	898	2,346	308
Ohio	6,302	1,820	2,908	1,574	4,748	1,209	2,114	1,425
Wisconsin	2,831	1,276	1,241	314	2,127	898	944	285
West North Central	10,589	3,622	4,996	1,971	8,351	2,564	3,917	1,870
Iowa	2,206	596	1,246	364	1,776	432	921	423
Kansas	1,571	520	885	166	1,229	491	603	135
Minnesota	1,779	549	1,133	97	1,730	582	965	183
Missouri	2,430	650	1,022	758	1,947	458	866	623
Nebraska	1,366	721	265	380	819	264	247	308
North Dakota	609	331	156	122	416	163	114	139
South Dakota	628	255	289	84	434	174	201	59
Mountain	4,122	1,491	2,607	42	3,268	1,047	2,155	66
Arizona	1,213	455	776	—	878	310	568	—
Colorado	854	361	451	42	667	250	351	66
Idaho	298	45	253	—	257	33	224	—
Montana	312	199	113	—	244	166	78	—
Nevada	251	61	190	—	186	38	148	—
New Mexico	552	96	456	—	363	67	296	—
Utah	447	201	246	—	542	147	395	—
Wyoming	195	73	122	—	131	36	95	—
Pacific	10,779	3,383	7,166	230	7,934	1,999	5,689	246
Alaska	188	126	62	—	78	38	40	—
California	7,568	2,142	5,196	230	5,679	1,252	4,181	246
Hawaii	262	115	147	—	129	—	129	—
Oregon	1,031	359	672	—	757	213	544	—
Washington	1,730	641	1,089	—	1,291	496	795	—

[1]Includes students in a few generic programs leading to a master's degree or doctoral degree.

SOURCE: National League for Nursing, Nursing Student Census, 1986.

Table 10-4. ADMISSIONS TO AND GRADUATIONS FROM PRACTICAL NURSING EDUCATIONAL PROGRAMS BY GEOGRAPHIC AREA, 1983-1984

Geographic area	Admissions[1]	Graduations[1]	Geographic area	Admissions[1]	Graduations[1]
United States	57,865	44,054			
New England	2,030	1,823	East North Central	8,924	7,286
Connecticut	402	296	Illinois	2,481	1,913
Maine	222	266	Indiana	1,188	893
Massachusetts	995	837	Michigan	1,674	1,348
New Hampshire	148	209	Ohio	2,630	2,380
Rhode Island	100	87	Wisconsin	951	752
Vermont	163	128			
Middle Atlantic	9,635	6,920	West North Central	5,130	4,478
New Jersey	1,813	1,132	Iowa	741	710
New York	4,464	2,933	Kansas	451	681
Pennsylvania	3,358	2,855	Minnesota	1,556	1,058
			Missouri	1,264	1,096
South Atlantic	10,355	7,072	Nebraska	558	446
Delaware	180	89	North Dakota	289	256
District of Columbia	122	59	South Dakota	271	231
Florida	2,759	2,250	Mountain	2,219	1,965
Georgia	1,977	1,301	Arizona	378	400
Maryland	579	429	Colorado	574	526
North Carolina	1,063	788	Idaho	181	149
South Carolina	790	576	Montana	246	155
Virginia	1,761	1,083	Nevada	75	57
West Virginia	1,124	497	New Mexico	274	274
			Utah	365	311
East South Central	4,871	3,523	Wyoming	126	93
Alabama	1,782	1,392			
Kentucky	1,128	722	Pacific	5,420	4,400
Mississippi	796	588	Alaska	23	15
Tennessee	1,165	821	California	4,094	2,999
			Hawaii	96	114
West South Central	9,323	6,587	Oregon	136	319
Arkansas	1,198	947	Washington	1,071	953
Louisiana	1,904	1,035			
Oklahoma	929	720			
Texas	5,292	3,885			

[1]Time period is August 1 through July 31 for the academic year.

SOURCE: National League for Nursing, Nursing Data Review, 1985.

Table 10-5. NURSES ADMITTED TO THE UNITED STATES, BY IMMIGRATION STATUS, SELECTED FISCAL YEARS, 1976-1986

Immigration status	1976	1978	1982	1984	1986
Total immigrant nurses	6,421	4,943	4,701	3,648	4,619
Total occupational preference	2,763	1,493	1,755	1,256	1,280
Third preference admissions	2,004	731	586	286	374
Adjustments	715	238	567	438	242
Sixth preference admissions	11	45	108	203	467
Adjustments	33	479	494	329	197
All others	3,658	3,450	2,946	2,392	3,339

SOURCE: Annual reports of Immigration and Naturalization Service, Department of Justice.

Table 10-6. PROFESSIONAL NURSES ADMITTED AS IMMIGRANTS,[1] BY COUNTRY OF LAST PERMANENT RESIDENCE, SELECTED FISCAL YEARS, 1976-1986

Country of last residence	1976	1978	1982	1984	1986
All countries	6,421	3,779	4,701	3,648	4,619
Europe	965	646	735	614	739
Germany	128	145	128	96	152
Ireland	50	12	30	36	39
United Kingdom	456	312	380	328	294
Other	331	177	197	154	254
Asia	4,460	2,153	2,716	1,994	2,650
Taiwan	72	102	83	72	63
India	1,236	79	429	162	188
Korea	821	319	171	111	117
Philippines	1,748	1,372	1,685	1,393	1,903
Thailand	230	33	32	18	38
Other	353	248	316	238	341
Africa	155	58	97	100	114
Oceania	82	36	66	70	65
North and Central America	607	781	977	776	918
Canada	293	399	456	380	353
Jamaica	87	124	186	158	175
Trinidad and Tobago	50	22	26	14	14
Other	177	236	309	224	376
South America	92	105	110	94	133
Guyana	38	36	67	38	59
Other	54	69	43	56	74

[1]Permanent resident aliens.

SOURCE: Annual reports of Immigration and Naturalization Service, Department of Justice.

Table 10-7. LICENSED PRACTICAL/VOCATIONAL NURSE POPULATION IN EACH STATE AND AREA, BY ACTIVITY STATUS: NOVEMBER 1983

Geographic area	Total number in sample	Licensed practical nurse population					
		Total	Employed as LP/VN		Not employed as LP/VN		Employed nurses per 100,000 population[1]
			Number	Percent	Number	Percent	
United States	17,235	781,506	539,463	69.0	242,042	31.0	231
New England	1,553	46,333	33,004	71.2	13,329	28.2	264
Connecticut	262	10,302	6,985	67.8	3,317	32.2	223
Maine	261	4,139	3,154	76.2	985	23.8	275
Massachusetts	449	23,018	16,553	71.9	6,465	28.1	287
New Hampshire	182	3,250	2,114	65.0	1,136	35.0	220
Rhode Island	206	3,364	2,488	73.9	877	26.1	261
Vermont	173	2,259	1,710	75.7	549	24.3	326
Middle Atlantic	2,005	137,040	82,885	60.5	54,154	39.5	224
New Jersey	388	22,794	14,212	62.3	8,582	37.7	190
New York	854	64,333	38,321	59.6	26,011	40.4	217
Pennsylvania	763	49,913	30,352	60.8	19,561	39.2	255
South Atlantic	2,744	121,494	86,872	71.5	34,622	28.5	224
Delaware	149	1,563	1,170	74.8	394	25.2	193
District of Columbia	127	2,245	1,719	76.6	526	23.4	276
Florida	578	33,687	23,954	71.1	9,733	28.9	224
Georgia	306	22,528	15,114	67.1	7,414	32.9	264
Maryland	274	10,215	6,770	66.3	3,445	33.7	158
North Carolina	363	17,962	13,310	74.1	4,652	25.9	219
South Carolina	282	9,200	7,042	76.5	2,158	23.5	216
Virginia	389	17,934	13,042	72.7	4,891	27.3	235
West Virginia	276	6,161	4,752	77.1	1,409	22.9	242
East South Central	1,286	56,050	41,598	74.2	14,453	25.8	278
Alabama	326	16,892	12,295	72.8	4,596	27.2	311
Kentucky	297	9,099	7,280	80.0	1,819	20.0	196
Mississippi	302	10,287	7,552	73.4	2,735	26.6	292
Tennessee	361	19,772	14,470	73.2	5,302	26.8	309
West South Central	1,756	103,123	70,671	68.5	32,452	31.5	274
Arkansas	274	11,527	7,788	67.6	3,739	32.4	335
Louisiana	305	15,600	11,513	73.8	4,087	26.2	259
Oklahoma	292	10,901	7,835	71.9	3,066	28.1	238
Texas	885	65,096	43,536	66.9	21,560	33.1	277
East North Central	2,348	135,561	94,979	70.1	40,582	29.9	229
Illinois	474	31,248	19,855	63.5	11,393	36.5	173
Indiana	363	13,814	10,546	76.3	3,268	23.7	192
Michigan	502	34,125	23,299	68.3	10,826	31.7	257
Ohio	661	41,228	29,542	71.7	11,686	28.3	384
Wisconsin	348	15,146	11,737	77.5	3,410	22.5	247
West North Central	2,177	64,495	48,729	75.6	15,765	24.4	280
Iowa	361	10,794	7,692	71.3	3,102	28.7	265
Kansas	243	6,624	5,327	80.4	1,297	19.6	220
Minnesota	435	18,795	13,842	73.6	4,954	26.4	334
Missouri	362	16,182	12,725	78.6	3,457	21.4	256
Nebraska	302	6,019	4,568	75.9	1,451	24.1	286
North Dakota	274	3,251	2,567	79.0	684	21.0	378
South Dakota	200	2,829	2,009	71.0	820	29.0	287
Mountain	1,643	32,882	21,386	65.0	11,496	35.0	173
Arizona	262	7,416	4,896	66.0	2,519	34.0	165
Colorado	219	8,718	5,252	60.2	3,466	39.8	167
Idaho	211	3,445	2,169	62.9	1,277	37.1	219
Montana	244	3,001	1,786	59.5	1,214	40.5	219
Nevada	142	1,785	1,249	70.0	536	30.0	140
New Mexico	162	3,714	2,659	71.6	1,055	28.4	190
Utah	233	3,698	2,617	70.8	1,081	29.2	162
Wyoming	170	1,105	785	68.6	347	31.4	147
Pacific	1,743	84,528	59,339	70.2	25,190	29.8	176
Alaska	119	1,025	569	55.5	456	44.5	119
California	843	60,757	44,721	73.6	16,036	26.4	178
Hawaii	185	2,539	1,770	69.7	770	30.3	173
Oregon	260	5,889	4,170	70.8	1,720	29.2	157
Washington	336	14,317	8,109	56.6	6,209	43.4	189

[1]Population data used for computation of nurse-population ratios were based on estimates of resident population as of July 1, 1983 in the publication of U.S. Department of Commerce, Bureau of the Census, Estimates of the Population of States, by Age: July 1, 1981 to 1983, Series P-25, No. 951, Issued May 1984.

SOURCE: U.S. Department of Health and Human Services, Division of Nursing. First National Sample Survey of Licensed Practical and Vocational Nurses, 1983. Accession No. HRP 0906278, National Technical Information Service, Springfield, VA, 1984.

Table 10-8. REGISTERED NURSE POPULATION IN EACH STATE AND AREA, BY ACTIVITY STATUS: NOVEMBER 1984

Geographic area	Registered nurse population						Employed nurses per 100,000 population[1]
	Number in sample	Total	Employed in nursing		Not employed in nursing		
			Number	Percent	Number	Percent	
United States	31,626	1,887,697	1,485,725	78.7	401,971	21.3	629
New England	3,118	158,044	119,914	75.9	38,130	24.1	953
Connecticut	643	35,508	26,407	74.4	9,101	25.6	837
Maine	447	11,360	8,453	74.4	2,906	25.6	731
Massachusetts	898	82,880	63,540	76.7	19,340	23.3	1,096
New Hampshire	450	11,627	8,024	69.0	3,603	31.0	821
Rhode Island	407	10,934	8,851	81.0	2,083	19.0	920
Vermont	273	5,735	4,639	80.9	1,096	19.1	875
Middle Atlantic	3,507	367,147	277,040	75.5	90,107	24.5	746
New Jersey	716	72,255	52,493	72.6	19,763	27.4	699
New York	1,437	167,653	133,310	79.5	34,343	20.5	752
Pennsylvania	1,354	127,239	91,238	71.7	36,001	28.3	767
South Atlantic	5,402	289,857	227,724	78.6	62,133	21.4	577
Delaware	301	5,476	4,423	80.8	1,054	19.2	722
District of Columbia	331	10,114	9,465	93.6	649	6.4	1,519
Florida	923	86,816	67,722	78.0	19,094	22.0	617
Georgia	618	36,304	29,365	80.9	6,939	19.1	503
Maryland	790	38,796	31,565	81.4	7,231	18.6	726
North Carolina	788	40,541	32,460	80.1	8,081	19.9	527
South Carolina	432	18,049	13,761	76.2	4,289	23.8	417
Virginia	745	40,222	28,477	70.8	11,745	29.2	505
West Virginia	474	13,538	10,485	77.5	3,052	22.5	537
East South Central	2,056	85,526	72,429	84.7	13,096	15.3	482
Alabama	520	24,329	19,750	81.2	4,578	18.8	495
Kentucky	587	19,332	16,799	86.9	2,533	13.1	451
Mississippi	468	13,275	10,577	79.7	2,698	20.3	407
Tennessee	481	28,589	25,302	88.5	3,287	11.5	536
West South Central	2,317	145,661	113,518	77.9	32,143	22.1	435
Arkansas	431	12,576	10,258	81.6	2,318	18.4	437
Louisiana	542	21,603	17,372	80.4	4,232	19.6	389
Oklahoma	450	17,143	13,569	79.2	3,574	20.8	411
Texas	894	94,339	72,320	76.7	22,020	23.3	452
East North Central	4,101	345,202	277,280	80.3	67,922	19.7	667
Illinois	910	99,290	80,564	81.1	18,726	18.9	700
Indiana	719	39,383	32,240	81.9	7,143	18.1	586
Michigan	694	73,114	56,449	77.2	16,665	22.8	622
Ohio	1,002	93,836	75,676	80.6	18,160	19.4	704
Wisconsin	776	39,579	32,351	81.7	7,229	18.3	679
West North Central	4,105	149,298	125,639	84.2	23,659	15.9	717
Iowa	692	28,609	23,704	82.9	4,905	17.1	815
Kansas	571	19,608	15,943	81.3	3,665	18.7	664
Minnesota	790	37,950	32,229	84.9	5,721	15.1	774
Missouri	722	36,784	31,866	86.6	4,918	13.4	636
Nebraska	563	13,437	11,094	82.6	2,342	17.4	691
North Dakota	415	6,404	5,637	88.0	767	12.0	822
South Dakota	352	6,505	5,164	79.4	1,340	20.6	731
Mountain	3,356	95,264	72,448	76.1	22,817	24.0	577
Arizona	582	25,875	19,015	73.5	6,860	26.5	623
Colorado	590	29,469	21,212	72.0	8,258	28.0	667
Idaho	322	6,389	5,039	78.9	1,349	21.1	503
Montana	404	6,942	5,260	75.8	1,682	24.2	638
Nevada	346	5,878	4,849	82.5	1,029	17.5	532
New Mexico	372	8,846	7,255	82.0	1,591	18.0	509
Utah	370	8,697	7,151	82.2	1,546	17.8	433
Wyoming	370	3,167	2,667	84.2	501	15.8	522
Pacific	3,664	251,697	199,734	79.4	51,964	20.7	584
Alaska	327	4,018	3,256	81.0	762	19.0	651
California	1,543	176,601	141,834	80.3	34,767	19.7	554
Hawaii	416	8,569	6,462	75.4	2,107	24.6	622
Oregon	669	22,097	18,081	81.8	4,016	18.2	676
Washington	709	40,412	30,100	74.5	10,312	25.5	692

[1]Population data were based on provisional estimates of resident population as of July 1, 1984 in the publication of U.S. Department of Commerce, Bureau of the Census, State Population Estimates, by Age and Components of Change: 1980 to 1984, Series P-25, No. 970, Issued June 1985.

SOURCE: Moses, Evelyn B., The Registered Nurse Population: Findings from the National Sample Survey of Registered Nurses, November 1984. Accession No. HRP 0906938, National Technical Information Service, Springfield, VA, 1986.

Table 10-9. ESTIMATED FULL-TIME EQUIVALENT REGISTERED NURSE SUPPLY, 1984 AND LICENSED PRACTICAL/VOCATIONAL NURSE SUPPLY, 1983

	1984		1983	
	FTE RNs	RNs per 100,000 population[1]	FTE LP/VNs	LP/VNs per 100,000 population[2]
United States	1,234,875	523	471,142	202
New England	93,360	742	26,758	214
Connecticut	20,698	656	5,757	183
Maine	6,599	571	2,580	225
Massachusetts	48,956	844	13,181	229
New Hampshire	6,383	653	1,730	180
Rhode Island	7,060	734	2,127	223
Vermont	3,665	692	1,383	263
Middle Atlantic	230,415	620	72,568	196
New Jersey	42,689	568	12,120	162
New York	111,409	628	33,622	190
Pennsylvania	76,316	641	26,826	226
South Atlantic	197,157	500	77,983	201
Delaware	3,736	609	997	165
District of Columbia	8,433	1,354	1,528	245
Florida	58,130	530	21,068	197
Georgia	25,561	438	14,201	248
Maryland	26,361	606	5,982	139
North Carolina	29,251	474	12,017	198
South Carolina	12,259	371	6,478	198
Virginia	24,215	430	11,306	204
West Virginia	9,208	472	4,406	224
East South Central	65,224	434	38,319	256
Alabama	18,000	451	11,432	289
Kentucky	14,395	387	6,766	182
Mississippi	9,737	375	7,054	273
Tennessee	23,090	490	13,067	279
West South Central	101,336	388	64,496	250
Arkansas	9,129	389	7,001	301
Louisiana	15,361	344	10,599	239
Oklahoma	11,625	353	7,187	218
Texas	65,222	408	39,709	253
East North Central	225,765	543	80,424	194
Illinois	67,318	585	17,249	150
Indiana	26,504	482	8,977	164
Michigan	46,283	510	19,710	217
Ohio	61,101	568	25,221	235
Wisconsin	24,558	515	9,267	195
West North Central	101,089	577	40,561	233
Iowa	18,821	647	6,450	222
Kansas	13,785	565	4,585	189
Minnesota	24,024	577	10,719	257
Missouri	27,119	542	11,186	225
Nebraska	9,040	563	3,852	241
North Dakota	4,314	629	2,164	318
South Dakota	3,967	562	1,605	229
Mountain	58,871	469	18,058	146
Arizona	16,125	528	4,237	143
Colorado	16,562	521	4,246	135
Idaho	4,001	400	1,836	185
Montana	3,927	477	1,469	180
Nevada	4,349	477	1,131	127
New Mexico	6,076	427	2,363	169
Utah	5,621	340	2,114	131
Wyoming	2,210	432	662	129
Pacific	161,657	473	51,976	155
Alaska	2,698	540	478	100
California	115,648	451	39,774	158
Hawaii	5,733	552	1,659	162
Oregon	13,871	519	3,273	123
Washington	23,706	545	6,792	158

Estimated numbers may not add to total due to rounding.
[1]Population data used for RN population ratios are from U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 970, June 1985.
[2]Population data used for LP/VN population ratios are from U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 951, May 1984.

SOURCE: Estimates by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-10. DISTRIBUTION OF THE REGISTERED NURSE SUPPLY, BY PRINCIPAL EMPLOYMENT SETTING AND NURSING-RELATED EDUCATIONAL PREPARATION, NOVEMBER 1984

Field of employment	Estimated Total[1]		Highest nursing-related educational preparation									
			Diploma		Associate degree		Baccalaureate		Master's		Doctorate	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total	1,485,725	100.0	620,350	41.8	372,572	25.1	395,842	26.6	85,567	5.8	4,900	0.3
Hospital	1,011,955	100.0	399,873	39.5	288,089	28.5	279,999	27.7	40,103	4.0	511	0.1
Nursing home, extended care facility	115,077	100.0	68,493	59.5	24,901	21.6	17,928	15.6	2,606	2.3	—	—
Nursing education	40,311	100.0	3,368	8.4	1,818	4.5	10,119	25.1	21,159	52.5	3,743	9.3
Community/public health	101,430	100.0	35,323	34.8	19,357	19.1	37,631	37.1	8,570	8.4	—	—
Student health service	43,144	100.0	18,330	42.5	3,694	8.6	15,837	36.7	5,026	11.7	204	0.5
Occupational health	22,890	100.0	14,064	61.4	3,714	16.2	3,851	16.8	934	4.1	326	1.4
Ambulatory care setting employee	97,374	100.0	54,951	56.4	20,620	21.2	18,192	18.7	2,912	3.0	86	0.1
Private duty nursing	22,675	100.0	12,543	55.3	4,487	19.8	4,661	20.6	714	3.1	270	1.2
Other self-employed	9,214	100.0	2,348	25.5	1,870	20.3	2,754	29.9	2,072	22.5	169	1.8
Other	21,450	100.0	11,055	51.5	4,007	18.7	4,678	21.8	1,470	6.9	187	0.9
Not known	207	100.0	—	—	15	7.2	192	92.8	—	—	—	—

[1]Includes an estimated 6,495 nurses for whom no information was available on highest nursing-related preparation.

SOURCE: Moses, Evelyn B., The Registered Nurse Population: Findings from the National Sample Survey of Registered Nurses, November 1984. Accession No. HRP 0906938, National Technical Information Service, Springfield, VA, 1986.

Table 10-11. FIELD OF EMPLOYMENT AND TYPE OF POSITION OF EMPLOYED LICENSED PRACTICAL/VOCATIONAL NURSES: NOVEMBER 1983

Field of employment	Total	Charge nurse	Private duty nurse	Staff nurse	No position title	Other	Not known
Total licensed practical nurses employed in nursing	539,463	103,425	22,797	351,697	48,928	4,170	8,447
Hospital	310,842	15,863	1,597	274,520	18,061	454	349
Nursing home	121,398	78,315	1,210	36,138	3,787	1,694	254
Public/community health	13,574	2,022	834	7,706	2,219	779	13
Student health	4,200	215	—	2,516	806	585	78
Occupational health	6,056	874	312	2,941	1,826	102	—
Physicians or dentists office	48,969	5,043	45	23,829	19,636	294	122
Private duty	19,959	260	18,175	703	745	61	13
Other	6,237	721	501	3,074	1,740	201	—
Not known	8,229	112	122	271	107	—	7,617

Individual items may not add to total because of rounding.

SOURCE: U.S. Department of Health and Human Services, Division of Nursing, First National Sample Survey of Licensed Practical and Vocational Nurses, 1983. Accession No. HRP 0906278, National Technical Information Service, Springfield, VA, 1984.

Table 10-12. EMPLOYMENT AND VACANCY RATES OF NURSING PERSONNEL IN U.S. REGISTERED HOSPITALS AND IN COMMUNITY HOSPITALS BY TYPE OF PERSONNEL, 1981-1985

Personnel classification	U.S. registered hospitals					Community hospitals				
	1981	1982	1983	1984	1985	1981	1982	1983	1984	1985
Total hospital personnel	4,124,974	4,250,421	4,215,014	4,117,238	4,116,854	3,470,567	3,585,290	3,579,711	3,481,588	3,464,178
Full time	3,197,902	3,295,286	3,258,474	3,199,799	3,178,596	2,596,609	2,686,998	2,680,550	2,619,945	2,585,680
Part time	927,072	955,135	956,540	917,439	938,258	873,958	898,292	899,161	861,643	878,498
FTE[1]	3,661,438	3,772,854	3,736,744	3,658,519	3,647,725	3,033,588	3,136,144	3,130,130	3,050,767	3,024,929
Vacancy rate	4.2	3.3	3.1	3.3	(2)	4.2	3.2	3.0	3.3	(2)
Registered nurses	823,321	881,791	913,945	915,978	937,026	751,301	804,709	836,504	835,947	851,827
Full time	571,790	606,852	627,748	630,106	641,799	507,407	539,130	559,800	559,732	566,677
Part time	251,531	274,939	286,197	285,872	295,227	243,894	265,580	276,704	276,215	285,150
FTE[1]	697,556	744,322	770,847	773,042	789,412	629,354	671,918	698,151	697,480	709,253
Vacancy rate	7.6	5.3	4.4	4.5	(2)	7.6	5.3	4.4	4.6	(2)
Licensed practical/ vocational nurses	304,606	311,338	302,331	272,464	253,682	274,722	280,658	271,912	242,635	221,987
Full time	221,712	223,682	215,881	194,190	181,136	193,730	195,016	187,558	166,482	151,572
Part time	82,894	87,656	86,450	78,274	72,546	80,992	85,642	84,354	76,153	70,415
FTE[1]	263,159	267,510	259,106	233,327	217,409	234,226	237,837	229,735	204,559	186,780
Vacancy rate	5.8	3.7	3.1	0.2	(2)	5.5	3.4	2.8	3.3	(2)
Ancillary personnel	428,671	437,607	451,128	410,229	382,757	324,802	332,138	341,364	299,219	272,827
Full time	336,207	339,865	351,446	324,707	303,059	236,426	238,891	246,907	219,220	198,878
Part time	92,464	97,742	99,683	85,522	79,698	88,376	93,247	94,367	79,999	73,949
FTE[1]	382,439	388,736	401,287	367,468	342,908	280,614	285,514	294,180	259,220	235,883
Vacancy rate	3.0	2.6	2.6	0.1	(2)	2.9	2.4	2.3	2.9	(2)

[1]FTE = Full-time equivalent.
[2]Data not available.

SOURCE: American Hospital Association, Annual Surveys of Hospitals, 1981-1985.

Table 10-13. TOTAL AND FULL-TIME EQUIVALENT EMPLOYMENT OF NURSING PERSONNEL IN COMMUNITY HOSPITALS, BY GEOGRAPHIC AREA, 1985

	Registered nurses		LPNs/LVNs		Ancillary personnel	
	Total employment	FTE employment	Total employment	FTE employment	Total employment	FTE employment
United States	851,827	709,253	221,987	186,780	272,827	235,853
New England	57,064	43,936	12,346	9,002	13,765	10,845
Connecticut	11,974	9,215	2,393	1,775	3,145	2,510
Maine	4,740	3,638	1,461	1,072	1,181	903
Massachusetts	30,464	25,538	5,883	4,242	7,538	5,939
New Hampshire	3,859	3,023	776	565	607	499
Rhode Island	4,226	3,173	1,134	819	963	729
Vermont	1,801	1,349	699	529	331	265
Middle Atlantic	154,810	133,162	32,818	28,093	48,259	43,220
New Jersey	26,257	21,818	6,567	5,570	8,626	7,353
New York	74,531	65,845	13,812	12,018	25,579	23,512
Pennsylvania	54,022	45,499	12,439	10,505	14,054	12,355
South Atlantic	132,903	116,004	37,223	33,021	47,782	43,066
Delaware	2,167	1,826	448	375	592	527
District of Columbia	5,409	4,931	634	617	1,349	1,260
Florida	39,399	35,222	10,309	9,171	13,187	12,093
Georgia	19,388	16,758	6,832	6,175	8,460	7,619
Maryland	15,847	12,648	2,407	2,027	5,355	4,585
North Carolina	18,840	16,867	4,931	4,382	6,481	5,828
South Carolina	8,303	7,429	3,481	3,116	4,700	4,265
Virginia	16,925	14,375	5,843	5,081	4,659	4,072
West Virginia	6,625	5,948	2,338	2,077	2,999	2,817
East South Central	46,327	41,895	18,792	17,170	21,700	19,601
Alabama	12,395	11,548	5,225	4,856	4,261	3,852
Kentucky	11,460	9,955	3,458	3,068	5,806	5,046
Mississippi	6,645	6,036	3,625	3,353	3,751	3,485
Tennessee	15,827	14,356	6,484	5,893	7,882	7,218
West South Central	70,168	62,132	31,164	27,944	29,200	26,520
Arkansas	6,318	5,681	3,880	3,413	2,582	2,314
Louisiana	12,095	10,706	5,234	4,705	7,462	6,926
Oklahoma	8,486	7,386	3,733	3,373	4,283	3,842
Texas	43,269	38,359	18,317	16,453	14,873	13,438
East North Central	165,707	134,605	39,135	31,174	53,970	44,835
Illinois	48,287	40,087	8,065	6,805	15,578	13,395
Indiana	19,068	15,521	4,510	3,637	7,571	6,255
Michigan	34,922	28,387	10,556	8,271	11,480	9,431
Ohio	45,804	37,339	12,519	10,039	12,864	10,938
Wisconsin	17,626	13,271	3,485	2,422	6,477	4,816
West North Central	71,133	54,573	18,076	13,898	21,842	17,440
Iowa	11,741	9,205	2,080	1,591	2,805	2,219
Kansas	8,710	7,180	2,175	1,770	3,423	2,805
Minnesota	18,325	12,239	4,619	3,110	3,655	2,690
Missouri	20,002	16,626	5,329	4,545	8,318	6,997
Nebraska	6,467	4,994	1,862	1,430	1,686	1,327
North Dakota	3,234	2,301	1,252	889	905	628
South Dakota	2,655	2,028	759	563	1,050	774
Mountain	38,169	31,196	8,097	6,564	9,836	8,269
Arizona	10,562	8,672	1,758	1,463	3,527	3,056
Colorado	10,422	8,252	1,524	1,188	2,270	1,884
Idaho	2,563	1,981	1,056	818	648	492
Montana	2,209	2,209	508	507	20	20
Nevada	2,668	2,286	660	565	716	622
New Mexico	3,884	3,064	1,161	895	1,258	1,075
Utah	4,503	3,616	1,090	837	915	720
Wyoming	1,358	1,116	340	291	482	400
Pacific	115,545	91,787	24,336	19,927	26,473	22,069
Alaska	1,261	921	200	133	181	153
California	87,626	70,619	19,055	15,812	20,911	17,604
Hawaii	2,334	2,037	624	561	692	622
Oregon	10,440	7,564	1,540	1,134	1,928	1,475
Washington	13,884	10,646	2,917	2,287	2,761	2,215

SOURCE: American Hospital Association, Annual Survey of Hospitals, 1985.

Table 10-14. NUMBER OF FULL-TIME EQUIVALENT[1] REGISTERED NURSES, LICENSED PRACTICAL/VOCATIONAL NURSES, AND NURSING AIDES PER 100 RESIDENTS IN NURSING HOMES, BY GEOGRAPHIC AREA, 1982

Geographic area	Total nursing personnel	RNs	LP/VNs	Nursing aides
United States	40.4	4.6	6.2	29.6
New England	37.1	6.1	4.9	26.1
Connecticut	24.9	6.0	3.5	15.4
Maine	35.3	4.1	3.6	27.6
Massachusetts	41.3	6.1	5.7	29.4
New Hampshire	44.7	9.5	6.1	29.1
Rhode Island	49.6	7.2	5.5	36.9
Vermont	33.3	5.4	5.1	22.7
Middle Atlantic	44.2	7.0	6.4	30.8
New Jersey	41.0	6.7	5.0	29.3
New York	41.8	6.6	6.5	28.7
Pennsylvania	50.1	7.7	7.1	35.3
South Atlantic	39.4	4.3	6.4	28.7
Delaware	36.8	7.5	6.2	23.1
District of Columbia	46.8	6.5	7.9	32.4
Florida	39.2	4.8	6.0	28.4
Georgia	37.3	2.5	7.6	27.2
Maryland	43.4	5.5	6.0	31.9
North Carolina	35.6	3.9	5.4	26.3
South Carolina	46.1	5.1	8.2	32.8
Virginia	38.8	4.2	6.0	28.6
West Virginia	43.4	4.1	7.0	32.1
East South Central	43.7	2.7	7.8	33.2
Alabama	46.6	2.6	9.5	34.5
Kentucky	38.8	2.6	4.8	31.4
Mississippi	48.1	3.7	9.7	34.7
Tennessee	43.9	2.5	8.4	33.0
West South Central	35.5	1.6	7.9	26.0
Arkansas	34.6	2.1	9.2	23.3
Louisiana	35.2	1.7	7.9	25.6
Oklahoma	28.5	1.5	4.8	22.2
Texas	37.8	1.4	8.5	27.9
East North Central	40.3	4.5	5.7	30.1
Illinois	34.2	4.3	4.9	25.1
Indiana	37.1	3.5	4.2	29.4
Michigan	43.9	4.0	5.5	34.4
Ohio	46.6	5.3	7.6	33.7
Wisconsin	41.6	5.2	5.7	30.7
West North Central	37.9	3.6	4.8	29.5
Iowa	32.2	3.5	5.8	22.9
Kansas	42.3	2.6	3.6	36.1
Minnesota	41.9	5.4	5.7	30.8
Missouri	38.3	2.5	4.1	31.7
Nebraska	35.7	3.1	3.9	28.8
North Dakota	35.1	5.1	5.1	24.9
South Dakota	33.1	3.1	3.6	26.4
Mountain	42.2	6.2	6.4	29.5
Arizona	42.9	6.6	5.3	30.9
Colorado	40.8	6.8	6.0	28.0
Idaho	48.7	6.2	7.4	35.0
Montana	40.5	6.1	6.7	27.7
Nevada	46.0	8.4	6.7	30.9
New Mexico	38.3	3.8	6.6	27.9
Utah	42.6	3.9	8.1	30.5
Wyoming	39.1	6.1	6.5	26.5
Pacific	44.1	5.7	6.6	31.8
Alaska	34.6	8.2	2.3	24.1
California	47.1	5.5	7.5	34.1
Hawaii	37.0	5.4	4.6	27.0
Oregon	39.7	5.7	4.2	29.8
Washington	37.2	6.6	5.1	25.5

[1]Full-time equivalents include all full-time personnel plus one-half of part-time personnel.

SOURCE: Derived from data in U.S. Department of Health and Human Services, National Center for Health Statistics, 1982 Master Facility Inventory, unpublished.

Table 10-15. AVERAGE ANNUAL EARNINGS OF REGISTERED NURSES EMPLOYED FULL-TIME IN THEIR PRINCIPAL NURSING POSITION, BY FIELD OF EMPLOYMENT AND TYPE OF POSITION: NOVEMBER 1984

Field of employment	Total[1]	Administrator or assistant	Consultant	Supervisor or assistant	Instructor	Head nurse or assistant	Staff nurse	Nurse practitioner/ midwife	Clinical nurse specialist	Nurse clinician	Certified nurse anesthetist	Researcher	Private duty
Total	$23,505	$29,164	$25,922	$24,914	$24,759	$25,168	$21,704	$25,975	$25,815	$24,283	$37,991	$24,621	$21,585
Hospital	24,188	32,982	(2)	26,629	25,931	25,931	22,394	27,970	26,512	25,396	37,552	24,858	—
Nursing home extended care facility	20,483	22,776	(2)	19,870	19,892	19,822	18,220	(2)	(2)	—	—	—	—
Nursing education	25,633	34,576	(2)	(2)	24,564	(2)	(2)	(2)	(2)	(2)	—	—	—
Community/public health	21,998	28,256	23,929	23,181	(2)	(2)	20,006	22,689	(2)	(2)	(2)	—	—
Student health service	20,153	(2)	(2)	(2)	(2)	(2)	19,310	(2)	(2)	(2)	—	—	—
Occupational health	24,188	(2)	(2)	25,043	(2)	(2)	22,969	(2)	(2)	(2)	—	—	—
Ambulatory care setting	19,932	29,259	(2)	21,035	(2)	18,416	18,032	27,655	21,537	20,126	(2)	(2)	—
Private duty	21,585	—	—	—	—	—	—	—	—	—	—	—	21,585
Other self-employed	34,882	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	(2)	—
Other	24,177	31,352	23,765	(2)	(2)	(2)	20,829	(2)	(2)	(2)	(2)	(2)	—

[1]Includes all registered nurses in positions not separately identified as well as those itemized separately.
[2]Too few to compute average.

SOURCE: Moses, Evelyn B., The Registered Nurse Population: Findings from the National Sample Survey of Registered Nurses, November 1984. Accession No. HRP 0906938, National Technical Information Service, Springfield, VA, 1986.

Table 10-16. AVERAGE ANNUAL EARNINGS OF LICENSED PRACTICAL/VOCATIONAL NURSES EMPLOYED FULL TIME IN THEIR PRINCIPAL NURSING POSITION, BY FIELD OF EMPLOYMENT AND TYPE OF POSITION: NOVEMBER 1983

Field of employment	Total[1]	Charge nurse	Private duty nurse	Staff nurse	No position title
Total	$14,395	$13,938	$11,934	$14,714	$13,914
Hospital	$15,106	$15,415	(2)	$15,083	$15,256
Nursing home	13,463	13,498	(2)	13,449	13,044
Public/community health	13,730	14,537	(2)	13,907	13,319
Student health	11,053	(2)	(2)	10,887	(2)
Occupational health	15,472	(2)	(2)	15,201	15,326
Physician or dentist offices	13,068	14,743	(2)	12,801	2,853
Private duty	11,845	(2)	11,744	(2)	(2)

[1]Includes all licensed practical/vocational nurses in positions not separately identified, as well as those itemized separately.
[2]Too few to compute average.

SOURCE: U.S. Department of Health and Human Services, Division of Nursing. First National Sample Survey of Licensed Practical and Vocational Nurses, 1983. Accession No. HRP 0906278, National Technical Information Service, Springfield, VA, 1984.

Table 10-17. PROJECTED NUMBER OF GRADUATES FROM PRACTICAL NURSING EDUCATIONAL PROGRAMS, BY TYPE OF PROGRAM, ACADEMIC YEARS 1985-1986 THROUGH 2019-2020

ACADEMIC YEAR	TOTAL
1985 - 86	34,700
1986 - 87	33,800
1987 - 88	33,700
1988 - 89	33,400
1989 - 90	33,000
1990 - 91	32,600
1991 - 92	32,100
1992 - 93	31,600
1993 - 94	31,100
1994 - 95	30,700
1995 - 96	30,200
1996 - 97	29,700
1997 - 98	29,200
1998 - 99	28,700
1999-2000	28,300
2000 - 01	27,800
2001 - 02	27,400
2002 - 03	27,000
2003 - 04	26,600
2004 - 05	26,100
2005 - 06	25,700
2006 - 07	25,300
2007 - 08	25,000
2008 - 09	24,600
2009 - 10	24,200
2010 - 11	23,900
2011 - 12	23,500
2012 - 13	23,200
2013 - 14	22,800
2014 - 15	22,500
2015 - 16	22,200
2016 - 17	21,900
2017 - 18	21,600
2018 - 19	21,300
2019-2020	21,000

SOURCE: Projections by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-18. PROJECTIONS OF NATIONAL SUPPLY OF LICENSED PRACTICAL/VOCATIONAL NURSES, 1983-2020

As of December 31	Total number of nurses	Total nurses per 100,000 population[1]	Full-time equivalents (FTE)	FTE per 100,000 population[1]
1983	539,500	231	471,000	202
1984	561,100	238	490,400	208
1985	575,300	242	503,000	211
1986	585,900	244	512,500	213
1987	596,700	246	522,100	215
1988	608,700	249	533,000	218
1989	623,000	252	545,600	221
1990	633,800	254	555,300	223
1991	643,600	256	564,200	225
1992	652,900	258	572,500	226
1993	663,500	260	582,100	228
1994	675,200	262	592,500	230
1995	682,800	264	599,400	231
1996	689,800	264	605,700	232
1997	696,500	265	611,900	233
1998	703,600	266	618,200	234
1999	712,100	268	625,800	235
2000	717,000	268	630,200	236
2001	720,800	268	633,600	236
2002	723,100	267	635,700	235
2003	727,200	268	639,200	236
2004	731,200	270	642,600	237
2005	732,800	266	644,000	234
2006	732,900	265	643,800	233
2007	731,000	263	641,700	231
2008	731,600	262	641,800	229
2009	731,400	260	641,200	228
2010	729,000	258	638,700	226
2011	725,100	255	634,700	223
2012	719,300	252	628,700	220
2013	717,400	250	626,500	218
2014	712,900	247	621,700	216
2015	707,300	244	616,000	212
2016	701,000	241	609,900	210
2017	693,500	237	602,600	206
2018	690,000	235	599,200	204
2019	682,300	231	591,500	201
2020	675,500	228	584,800	198

[1]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in State Population and Household Estimates to 1985 and Components of Change, Series P-25, No. 998, December 1986, and Projections of the Population of the United States by Age, Sex, and Race: 1983 to 2080, Series P-25, No. 952, May 1984.

SOURCE: Projections by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-19. PROJECTED NUMBER OF GRADUATES FROM BASIC NURSING PROGRAMS PREPARING REGISTERED NURSES, BY TYPE OF PROGRAM (SERIES A AND B), ACADEMIC YEARS 1985-86 THROUGH 2019-2020

Academic Year	Series A[1]				Series B[1]			
	Total	Associate degree	Diploma	Baccalaureate	Total	Associate degree	Diploma	Baccalaureate
1985 - 86[2]	80,900	44,700	12,000	24,200	81,900	44,700	12,000	25,200
1986 - 87	75,400	41,200	10,600	23,600	78,400	41,200	10,600	26,600
1987 - 88	75,600	43,000	9,600	23,000	79,600	43,000	9,600	27,000
1988 - 89	76,000	44,000	9,100	22,900	79,000	44,000	9,100	25,900
1989 - 90	75,500	44,500	8,600	22,400	79,200	44,500	8,600	26,100
1990 - 91	74,800	44,800	8,200	21,800	79,500	44,800	8,200	26,500
1991 - 92	74,300	45,000	7,800	21,500	79,500	45,000	7,800	26,700
1992 - 93	73,500	44,700	7,400	21,400	79,000	44,700	7,400	26,900
1993 - 94	72,600	44,500	7,100	21,000	78,600	44,500	7,100	27,000
1994 - 95	71,200	44,100	6,700	20,400	77,700	44,100	6,700	26,900
1995 - 96	70,100	43,700	6,400	20,000	76,800	43,700	6,400	26,700
1996 - 97	69,100	43,300	6,100	19,700	76,000	43,300	6,100	26,600
1997 - 98	68,300	43,000	5,800	19,500	75,200	43,000	5,800	26,400
1998 - 99	67,300	42,600	5,500	19,200	74,300	42,600	5,500	26,200
1999-2000	66,500	42,100	5,300	19,100	73,400	42,100	5,300	26,000
2000 - 01	65,500	41,600	5,000	18,900	72,400	41,600	5,000	25,800
2001 - 02	64,400	40,900	4,800	18,700	71,400	40,900	4,800	25,700
2002 - 03	63,400	40,400	4,500	18,500	70,400	40,400	4,500	25,500
2003 - 04	61,500	40,000	4,300	17,200	69,500	40,000	4,300	25,200
2004 - 05	60,500	39,700	4,100	16,700	68,700	39,700	4,100	24,900
2005 - 06	59,500	39,200	3,900	16,400	67,900	39,200	3,900	24,800
2006 - 07	58,700	38,800	3,700	16,200	67,100	38,800	3,700	24,600
2007 - 08	57,900	38,400	3,500	16,000	66,300	38,400	3,500	24,400
2008 - 09	57,300	38,000	3,400	15,900	65,600	38,000	3,400	24,200
2009 - 10	56,600	37,600	3,200	15,800	64,900	37,600	3,200	24,100
2010 - 11	55,900	37,200	3,000	15,700	64,100	37,200	3,000	23,900
2011 - 12	55,300	36,900	2,900	15,500	63,500	36,900	2,900	23,700
2012 - 13	54,900	36,700	2,800	15,400	63,100	36,700	2,800	23,600
2013 - 14	54,500	36,400	2,700	15,400	62,500	36,400	2,700	23,400
2014 - 15	54,000	36,200	2,500	15,300	62,000	36,200	2,500	23,300
2015 - 16	53,700	36,000	2,400	15,300	61,600	36,000	2,400	23,200
2016 - 17	53,400	35,800	2,300	15,300	61,200	35,800	2,300	23,100
2017 - 18	53,100	35,700	2,200	15,200	60,900	35,700	2,200	23,000
2018 - 19	52,800	35,500	2,100	15,200	60,600	35,500	2,100	23,000
2019 - 20	52,600	35,400	2,000	15,200	60,300	35,400	2,000	22,900

[1]Series A projections assume a more constrained trend in basic baccalaureate nursing programs and continuation of trends in other basic nursing programs.
Series B projections assume a continuation of trends in basic programs of the past few years.
[2]Preliminary figures from the National League for Nursing on the number of graduates from basic nursing education programs in 1985-1986 show a total of about 77,000 with 41,200 associate degree; 10,500 diploma, and 25,100 baccalaureate.

SOURCE: Projections by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-20. PROJECTIONS OF NATIONAL SUPPLY OF REGISTERED NURSES 1984 - 2020 (SERIES A)[1]

As of December 31	Total number of nurses					Full-time equivalents				
	Total RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]	Total RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]
1984	1,485,700	997,300	397,600	90,900	629	1,234,900	813,600	339,500	81,800	523
1985	1,554,400	1,028,000	421,500	94,900	649	1,283,100	838,900	359,200	84,900	539
1986	1,602,400	1,058,100	444,200	100,100	667	1,331,500	864,100	377,800	89,600	554
1987	1,663,200	1,085,300	473,100	104,800	686	1,383,200	887,000	402,300	93,900	570
1988	1,723,100	1,110,800	501,600	110,700	704	1,434,200	908,000	426,800	99,400	586
1989	1,784,600	1,139,500	528,900	116,200	723	1,486,200	932,000	449,900	104,400	602
1990	1,842,000	1,164,000	555,800	122,200	739	1,534,700	952,500	472,400	109,800	616
1991	1,876,500	1,177,100	572,200	127,300	747	1,564,400	963,500	486,600	114,300	622
1992	1,916,400	1,190,200	592,100	134,000	757	1,598,700	974,900	503,300	120,500	631
1993	1,951,800	1,202,700	608,600	140,500	765	1,628,600	985,300	517,000	126,200	638
1994	1,989,800	1,218,600	624,300	146,900	774	1,661,000	998,900	530,000	132,100	646
1995	2,019,400	1,226,700	638,600	154,100	780	1,686,800	1,005,800	542,500	138,600	651
1996	2,045,000	1,234,300	649,800	161,000	784	1,709,800	1,012,400	552,500	144,900	656
1997	2,072,200	1,239,600	664,000	168,600	789	1,734,000	1,017,400	564,900	151,700	660
1998	2,097,400	1,243,500	676,900	177,100	794	1,756,600	1,021,100	576,200	159,300	665
1999	2,124,200	1,250,100	688,400	185,700	799	1,780,300	1,026,800	586,400	167,100	670
2000	2,145,100	1,250,800	699,900	194,300	802	1,799,000	1,027,500	596,600	174,900	673
2001	2,161,700	1,250,100	708,700	202,900	804	1,814,400	1,027,100	604,700	182,500	674
2002	2,179,600	1,247,200	720,500	211,900	804	1,830,600	1,025,000	615,100	190,500	676
2003	2,194,400	1,243,700	729,900	220,900	810	1,844,200	1,022,000	623,600	198,600	681
2004	2,210,200	1,242,100	738,900	229,100	816	1,858,700	1,020,900	631,600	206,200	686
2005	2,222,700	1,238,600	746,800	237,300	808	1,870,400	1,018,200	638,600	213,600	680
2006	2,227,000	1,232,400	749,000	245,600	805	1,875,100	1,013,300	640,600	221,200	678
2007	2,232,000	1,222,900	755,100	253,900	802	1,880,000	1,005,200	646,000	228,800	676
2008	2,234,700	1,212,500	760,000	262,200	799	1,882,800	996,700	650,000	236,200	673
2009	2,240,600	1,206,500	763,800	270,300	797	1,888,300	991,600	653,200	243,500	672
2010	2,242,000	1,196,400	767,700	277,900	793	1,890,500	983,500	656,500	250,400	669
2011	2,236,700	1,183,500	767,500	285,800	787	1,886,100	972,600	655,200	257,600	664
2012	2,230,900	1,168,800	768,400	293,700	780	1,881,800	960,200	656,600	265,000	659
2013	2,224,000	1,154,500	768,200	301,300	775	1,876,700	948,200	656,400	272,100	654
2014	2,217,900	1,142,500	767,200	308,200	769	1,871,600	937,900	655,200	278,500	649
2015	2,208,000	1,126,300	766,100	315,600	762	1,863,300	924,000	654,000	285,300	643
2016	2,194,700	1,111,700	760,600	322,500	754	1,852,200	911,600	649,000	291,600	636
2017	2,181,200	1,093,800	758,000	329,500	746	1,840,400	896,100	646,300	297,900	630
2018	2,167,300	1,076,700	754,600	336,000	738	1,828,200	881,300	643,000	303,900	623
2019	2,155,800	1,063,100	750,200	342,500	731	1,817,900	869,300	638,900	309,700	617
2020	2,142,500	1,047,700	746,600	348,200	724	1,806,400	856,100	635,500	314,900	610

[1]Series A projections assume a more constrained trend in basic baccalaureate nursing programs and continuation of trends in other basic nursing programs.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in State Population and Household Estimates to 1985 with Age and Components of Change, Series P-25, No. 998, December 1986, and Projections of the Population of the United States by Age, Sex, and Race: 1983 to 2080, Series P-25, No. 952, May 1984.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-21. PROJECTIONS OF NATIONAL SUPPLY OF REGISTERED NURSES 1984 - 2020 (SERIES B)[1]

As of December 31	Total number of nurses					Full-time equivalents				
	Total RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]	Total RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]
1984	1,485,700	997,300	397,600	90,900	629	1,234,900	813,600	339,500	81,800	523
1985	1,544,400	1,028,000	421,500	94,900	649	1,283,100	838,900	359,200	84,900	539
1986	1,602,400	1,058,100	444,200	100,100	667	1,331,500	864,100	377,800	89,600	554
1987	1,663,200	1,085,300	473,100	104,800	686	1,383,200	887,000	402,300	93,900	570
1988	1,723,100	1,110,800	501,600	110,700	704	1,434,200	908,000	426,800	99,400	586
1989	1,784,500	1,139,400	528,900	116,200	723	1,486,100	931,900	449,900	104,400	602
1990	1,843,800	1,163,600	557,900	122,200	740	1,536,400	952,200	474,400	109,800	617
1991	1,881,100	1,176,400	577,500	127,300	749	1,568,700	963,000	491,400	114,300	624
1992	1,924,200	1,189,000	601,100	134,000	760	1,605,900	974,000	511,400	120,500	634
1993	1,963,000	1,200,900	621,600	140,500	769	1,638,900	983,900	528,700	126,200	642
1994	2,005,600	1,216,000	642,600	146,900	780	1,675,400	996,900	546,400	132,100	651
1995	2,040,100	1,223,400	662,700	154,100	788	1,705,700	1,003,200	563,900	138,600	658
1996	2,070,900	1,230,100	679,900	161,000	794	1,733,200	1,009,300	579,100	144,900	664
1997	2,103,200	1,234,500	700,100	168,600	801	1,761,800	1,013,600	596,600	151,700	617
1998	2,133,500	1,237,500	719,000	177,000	808	1,788,900	1,016,600	613,000	159,300	677
1999	2,165,400	1,243,100	736,600	185,700	815	1,817,000	1,021,600	628,300	167,100	683
2000	2,191,400	1,242,900	754,200	194,300	819	1,840,100	1,021,700	643,500	174,800	688
2001	2,213,100	1,241,400	768,900	202,900	823	1,859,800	1,020,700	656,600	182,500	691
2002	2,236,000	1,237,600	786,500	211,800	825	1,880,200	1,017,900	671,800	190,500	694
2003	2,255,700	1,233,200	801,700	220,800	833	1,897,900	1,014,400	685,000	198,500	701
2004	2,277,300	1,230,900	817,300	229,000	841	1,917,400	1,012,700	698,600	206,100	708
2005	2,295,800	1,226,500	832,100	237,200	834	1,934,300	1,009,500	711,400	213,500	703
2006	2,306,600	1,219,900	841,200	245,500	834	1,944,500	1,004,200	719,200	221,100	703
2007	2,317,400	1,209,300	852,200	253,800	833	1,954,500	995,400	730,500	228,600	703
2008	2,326,200	1,198,100	866,000	262,000	832	1,962,700	986,300	740,300	236,100	702
2009	2,338,200	1,191,400	876,700	270,200	832	1,973,400	980,700	749,300	243,400	702
2010	2,345,600	1,180,600	887,300	277,700	830	1,980,800	972,100	758,400	250,300	701
2011	2,346,400	1,167,000	893,800	285,600	826	1,981,600	960,700	763,400	257,500	697
2012	2,346,500	1,151,600	901,300	293,500	822	1,982,400	947,800	769,700	264,900	694
2013	2,345,400	1,136,600	907,700	301,200	817	1,982,400	935,300	775,100	272,000	691
2014	2,345,100	1,123,900	913,100	308,100	813	1,982,400	924,500	779,600	278,400	687
2015	2,341,000	1,107,100	918,400	315,500	808	1,979,100	910,100	783,800	285,200	683
2016	2,333,300	1,091,900	919,100	322,300	801	1,972,900	897,200	784,200	291,500	678
2017	2,325,000	1,073,300	922,400	329,300	795	1,965,700	881,200	786,800	297,800	672
2018	2,316,200	1,055,500	924,900	335,800	789	1,958,100	865,900	788,500	303,700	667
2019	2,309,800	1,041,300	926,300	342,300	783	1,952,300	853,400	789,400	309,500	662
2020	2,301,600	1,025,300	928,300	348,000	777	1,945,300	839,700	790,800	314,700	657

[1] Series B projections assume a continuation of trends in basic programs of the past few years.

[2] Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in State Population and Household Estimates to 1985 with Age and Components of Change, Series P-25, No. 998, December 1986, and Projections of the Population of the United States by Age, Sex, and Race: 1983 to 2080, Series P-25, No. 952, May 1984.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-22. PROJECTED SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2000 (SERIES A)[1]

Geographic area	Total RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]
United States	2,145,100	1,250,810	699,920	194,330	802
New England	157,000	82,240	58,580	16,260	1,223
Connecticut	30,400	14,350	14,430	1,600	985
Maine	11,800	6,180	3,810	1,860	906
Massachusetts	77,900	42,050	24,610	11,280	1,412
New Hampshire	15,300	9,000	5,430	910	1,118
Rhode Island	13,900	5,740	7,710	460	1,479
Vermont	7,700	4,920	2,590	150	1,235
Middle Atlantic	369,200	205,630	119,940	43,680	1,086
New Jersey	79,900	47,200	26,570	6,150	1,066
New York	171,300	95,230	53,220	22,880	1,118
Pennsylvania	118,000	63,200	40,150	14,650	1,055
South Atlantic	376,600	240,000	104,630	32,230	763
Delaware	7,700	5,460	1,080	1,160	1,169
District of Columbia	9,500	3,850	1,400	4,220	2,350
Florida	138,400	87,050	39,050	12,310	790
Georgia	49,200	33,490	9,520	6,170	713
Maryland	45,200	30,790	12,900	1,520	972
North Carolina	49,500	31,600	13,990	3,920	714
South Carolina	19,700	11,720	6,620	1,360	506
Virginia	41,000	25,820	14,580	640	636
West Virginia	16,400	10,220	5,490	930	827
East South Central	115,700	63,200	44,170	8,380	686
Alabama	33,000	16,650	15,160	1,220	753
Kentucky	27,700	17,220	9,340	1,130	653
Mississippi	16,600	8,210	7,160	1,240	575
Tennessee	38,400	21,120	12,510	4,790	718
West South Central	196,500	101,530	78,450	16,540	601
Arkansas	17,100	13,940	2,790	370	619
Louisiana	22,800	11,740	9,090	2,000	450
Oklahoma	18,600	9,880	7,270	1,460	485
Texas	138,000	65,970	59,300	12,710	656
East North Central	365,900	221,760	111,420	32,760	887
Illinois	94,900	57,660	29,660	7,610	848
Indiana	42,100	20,770	14,060	7,280	750
Michigan	88,200	51,500	24,920	11,760	966
Ohio	100,300	67,980	28,380	3,920	981
Wisconsin	40,400	23,850	14,400	2,190	792
West North Central	169,200	107,750	47,430	14,020	943
Iowa	28,600	19,900	5,970	2,780	996
Kansas	22,600	14,520	5,870	2,210	902
Minnesota	45,500	30,760	10,710	3,990	1,021
Missouri	42,800	24,370	15,080	3,370	839
Nebraska	15,600	8,500	5,460	1,650	957
North Dakota	6,900	5,260	1,580	20	1,015
South Dakota	7,200	4,440	2,760	0	1,033
Mountain	110,200	58,710	41,920	9,560	564
Arizona	31,700	18,400	11,030	2,290	568
Colorado	25,800	13,840	8,540	3,390	571
Idaho	6,000	3,680	2,250	80	422
Montana	7,800	2,440	4,860	470	835
Nevada	10,600	7,240	2,130	1,230	582
New Mexico	14,100	6,670	6,890	570	803
Utah	9,300	5,020	3,680	600	356
Wyoming	4,900	1,420	2,540	930	555
Pacific	284,700	170,020	93,380	21,200	663
Alaska	5,800	4,340	1,040	380	854
California	188,000	112,750	61,440	13,770	597
Hawaii	8,700	6,110	2,320	280	684
Oregon	29,100	18,320	10,390	390	778
Washington	53,100	28,500	18,190	6,380	928

Figures may not add to total because of rounding.

[1]Series A projections assume a more constrained trend in basic baccalaureate nursing programs and continuation of trends in other basic nursing programs.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in Projections of the Population of the United States by Age, Sex, and Race: 1983-2080, Series P-25, No. 952, May 1984.

SOURCE: Estimates prepared by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, 1987.

Table 10-23. PROJECTED SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2000 (SERIES B)[1]

Geographic area	Total RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]
United States	2,191,400	1,242,920	754,170	194,270	819
New England	161,600	83,070	62,150	16,250	1,259
Connecticut	31,900	14,800	15,460	1,600	1,034
Maine	12,100	6,140	4,080	1,860	929
Massachusetts	79,400	42,130	26,010	11,270	1,439
New Hampshire	16,100	9,480	5,710	910	1,177
Rhode Island	14,300	5,620	8,180	460	1,522
Vermont	7,800	4,900	2,710	150	1,251
Middle Atlantic	376,300	202,930	129,770	43,660	1,106
New Jersey	80,900	46,940	27,850	6,150	1,079
New York	173,800	91,900	59,050	22,870	1,134
Pennsylvania	121,600	64,090	42,870	14,640	1,087
South Atlantic	383,500	239,720	111,850	31,940	777
Delaware	7,900	5,540	1,180	1,160	1,199
District of Columbia	9,600	3,840	1,500	4,220	2,375
Florida	140,000	86,570	41,110	12,300	800
Georgia	51,000	34,610	10,270	6,170	739
Maryland	45,600	30,280	13,820	1,520	981
North Carolina	50,400	31,100	15,410	3,920	727
South Carolina	20,400	11,830	7,170	1,360	524
Virginia	42,100	25,860	15,640	640	653
West Virginia	16,500	10,090	5,750	650	832
East South Central	122,200	65,340	48,480	8,380	725
Alabama	36,500	18,600	16,640	1,220	833
Kentucky	28,600	17,420	10,080	1,130	675
Mississippi	17,700	8,260	8,180	1,240	613
Tennessee	39,400	21,060	13,580	4,790	737
West South Central	205,600	103,480	85,600	16,530	629
Arkansas	17,500	14,160	2,980	370	633
Louisiana	25,500	12,680	10,850	2,000	503
Oklahoma	18,900	9,780	7,650	1,450	493
Texas	143,700	66,860	64,120	12,710	684
East North Central	365,000	212,000	120,270	27,130	885
Illinois	97,900	58,450	31,840	7,600	875
Indiana	44,200	21,460	15,470	7,280	788
Michigan	85,400	46,400	27,280	6,150	935
Ohio	96,500	63,260	29,330	3,910	944
Wisconsin	41,000	22,430	16,350	2,190	804
West North Central	172,000	107,000	51,050	14,010	959
Iowa	28,500	19,200	6,560	2,770	993
Kansas	23,300	14,740	6,330	2,210	930
Minnesota	46,100	30,480	11,660	3,990	1,034
Missouri	43,700	24,330	16,040	3,370	856
Nebraska	15,900	8,470	5,810	1,650	975
North Dakota	7,100	5,340	1,720	20	1,044
South Dakota	7,400	4,440	2,930	0	1,061
Mountain	113,100	52,640	44,430	9,560	579
Arizona	32,800	18,710	11,810	2,290	587
Colorado	26,200	13,810	9,000	3,390	580
Idaho	6,100	3,670	2,370	80	429
Montana	8,200	2,450	5,260	470	877
Nevada	10,700	7,210	2,220	1,230	587
New Mexico	14,500	6,670	7,290	570	825
Utah	9,600	5,200	3,820	600	367
Wyoming	5,000	1,420	2,660	930	566
Pacific	291,900	170,260	100,590	21,200	680
Alaska	5,800	4,330	1,100	380	854
California	193,300	113,060	66,510	13,770	613
Hawaii	8,800	6,110	2,440	280	692
Oregon	29,800	18,370	11,090	390	796
Washington	54,200	28,390	19,450	6,380	947

Figures may not add to total because of rounding.
[1]Series B projections assume a continuation of trends in basic programs of the past few years.
[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in Projections of the Population of the United States by Age, Sex, and Race: 1983-2080, Series P-25, No. 952, May 1984.

SOURCE: Estimates prepared by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, 1987.

Table 10-24. PROJECTED SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2020 (SERIES A)[1]

Geographic area	Total RNs	Associate Degree & Diploma	Bacca-laureate	Master's & Doctoral	RNs per 100,000 population[2]
United States	2,142,500	1,047,700	746,650	348,150	796
New England	143,000	44,690	70,330	28,010	1,003
Connecticut	26,100	5,590	17,970	2,520	775
Maine	14,000	5,320	4,750	3,920	937
Massachusetts	63,600	18,810	25,800	19,020	1,047
New Hampshire	16,300	8,100	6,510	1,720	1,046
Rhode Island	14,800	2,370	11,900	550	1,384
Vermont	8,200	4,500	3,400	280	1,188
Middle Atlantic	346,700	142,440	126,400	77,770	945
New Jersey	82,200	43,460	27,160	11,550	986
New York	154,100	69,270	46,050	38,760	949
Pennsylvania	110,400	29,710	53,190	27,460	911
South Atlantic	410,000	215,890	132,830	61,210	728
Delaware	8,700	5,270	990	2,240	1,120
District of Columbia	10,800	3,050	810	6,950	2,338
Florida	175,700	87,200	60,610	27,850	847
Georgia	47,100	26,280	10,320	10,490	614
Maryland	43,300	28,570	12,640	2,120	842
North Carolina	50,900	26,920	16,820	7,160	655
South Carolina	18,700	8,590	7,930	2,180	424
Virginia	37,600	21,650	14,930	970	524
West Virginia	17,200	8,360	7,780	1,070	786
East South Central	113,200	54,480	45,090	13,470	601
Alabama	28,200	9,420	17,110	1,640	578
Kentucky	30,700	20,290	8,860	1,510	647
Mississippi	16,400	7,840	6,770	1,740	505
Tennessee	37,900	16,930	12,350	8,580	636
West South Central	215,100	96,320	87,600	31,130	589
Arkansas	17,600	13,620	3,350	580	558
Louisiana	19,300	9,630	5,860	3,820	342
Oklahoma	20,600	8,150	9,930	2,530	475
Texas	157,600	64,920	68,460	24,200	674
East North Central	339,800	174,690	104,300	60,720	774
Illinois	77,300	38,470	26,510	12,300	652
Indiana	44,000	15,490	12,450	16,040	721
Michigan	88,600	44,490	21,210	22,860	944
Ohio	94,500	60,180	28,110	6,170	871
Wisconsin	35,400	16,060	16,020	3,350	623
West North Central	165,000	96,240	42,380	26,400	847
Iowa	28,000	18,320	3,970	5,730	892
Kansas	21,300	10,720	6,850	3,740	777
Minnesota	44,100	30,820	6,030	7,270	939
Missouri	42,800	22,470	13,650	6,670	772
Nebraska	16,100	5,690	7,400	2,990	886
North Dakota	6,200	4,840	1,380	0	814
South Dakota	6,500	3,380	3,100	0	846
Mountain	116,300	55,470	44,160	16,670	516
Arizona	33,500	17,810	11,840	3,850	508
Colorado	22,100	12,28	4,320	5,550	436
Idaho	6,000	3,320	2,670	0	369
Montana	9,200	1,440	7,060	710	852
Nevada	14,300	8,720	2,650	2,900	655
New Mexico	16,400	6,630	8,900	890	837
Utah	8,700	3,990	3,700	1,000	292
Wyoming	6,100	1,280	3,020	1,770	588
Pacific	293,800	167,500	93,570	32,790	618
Alaska	5,500	3,660	1,200	660	725
California	187,100	112,110	54,440	20,580	537
Hawaii	8,500	5,700	2,440	340	588
Oregon	32,900	16,300	16,000	600	777
Washington	59,800	29,730	19,490	10,610	959

Figures may not add to total because of rounding.

[1]Series A projections assume a more constrained trend in basic baccalaureate nursing programs and continuation of trends in other basic nursing programs.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in Projections of the Population of the United States by Age, Sex, and Race: 1983-2080, Series P-25, No. 952, May 1984.

SOURCE: Estimates prepared by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, 1987.

Table 10-25. PROJECTED SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2020, (SERIES B)[1]

Geographic area	Total RNs	Associate Degree & Diploma	Bacca-laureate	Master's & Doctoral	RNs per 100,000 population[2]
United States	2,301,600	1,025,340	928,250	347,960	777
New England	159,500	47,420	84,130	28,000	1,119
Connecticut	31,400	6,820	22,090	2,520	932
Maine	14,700	5,210	5,610	3,910	983
Massachusetts	68,700	18,850	30,830	19,020	1,130
New Hampshire	19,400	9,900	7,740	1,720	1,245
Rhode Island	16,600	2,190	13,870	550	1,552
Vermont	8,700	4,450	3,990	280	1,261
Middle Atlantic	370,400	135,590	157,060	77,720	1,010
New Jersey	86,900	42,740	32,580	11,540	1,042
New York	161,100	60,750	61,580	38,730	992
Pennsylvania	122,400	32,100	62,900	27,450	1,010
South Atlantic	434,700	214,380	159,020	61,160	771
Delaware	9,200	5,510	1,220	2,420	1,185
District of Columbia	11,000	3,010	1,030	6,950	2,381
Florida	182,600	85,500	69,240	27,820	880
Georgia	52,700	29,190	13,010	10,480	687
Maryland	45,200	27,250	15,870	2,120	879
North Carolina	54,500	25,340	22,010	7,150	701
South Carolina	20,500	8,830	9,510	2,180	465
Virginia	41,100	21,670	18,410	970	572
West Virginia	17,900	8,080	8,720	1,070	818
East South Central	130,200	59,360	57,320	13,470	691
Alabama	36,700	13,940	21,090	1,640	752
Kentucky	33,000	20,690	10,850	1,510	695
Mississippi	19,400	7,940	9,660	1,740	597
Tennessee	41,100	16,790	15,720	8,580	690
West South Central	245,000	101,890	112,030	31,120	671
Arkansas	18,900	14,340	3,990	580	599
Louisiana	29,600	13,160	12,590	3,810	524
Oklahoma	21,600	7,860	11,260	2,530	498
Texas	174,900	66,530	84,190	24,200	748
East North Central	338,200	148,220	129,220	60,670	771
Illinois	85,000	39,890	32,860	12,290	717
Indiana	48,900	16,680	16,200	16,010	801
Michigan	83,700	32,950	27,860	22,850	891
Ohio	83,900	46,850	30,830	6,170	773
Wisconsin	36,700	11,850	21,470	3,350	646
West North Central	174,200	94,660	53,090	26,370	895
Iowa	28,100	16,870	5,500	5,720	895
Kansas	23,300	11,270	8,250	3,740	850
Minnesota	45,800	30,240	8,280	7,260	976
Missouri	46,300	22,310	17,330	6,660	835
Nebraska	17,100	5,590	8,520	2,990	941
North Dakota	6,700	5,010	1,660	0	880
South Dakota	6,900	3,370	3,550	0	898
Mountain	126,800	56,290	53,890	16,670	563
Arizona	36,800	18,520	14,390	3,850	558
Colorado	24,000	12,140	6,350	5,550	473
Idaho	6,500	3,310	3,180	0	400
Montana	10,600	1,450	8,460	710	982
Nevada	14,500	8,630	3,020	2,900	664
New Mexico	18,200	6,600	10,690	890	929
Utah	9,600	4,360	4,230	1,000	323
Wyoming	6,600	1,280	3,570	1,770	636
Pacific	322,800	167,530	122,470	32,790	679
Alaska	5,700	3,620	1,430	660	751
California	207,700	112,630	74,440	20,580	596
Hawaii	8,900	5,670	2,860	340	615
Oregon	35,600	16,340	18,690	600	840
Washington	64,900	29,270	25,050	10,610	1,041

Figures may not add to total due to rounding.

[1]Series B projections assume a continuation of trends in basic programs of the past few years.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in Projections of the Population of the United States by Age, Sex, and Race: 1983-2080, Series P-25, No. 952, May 1984.

SOURCE: Estimates prepared by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, 1987.

Table 10-26. PROJECTED FULL TIME EQUIVALENT SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2000 (SERIES A)[1]

Geographic area	Total FTE RNs	Associate Degree & Diploma	Bacca-laureate	Master's & Doctoral	RNs per 100,000 population[2]
United States	1,799,000	1,027,520	596,590	174,880	672
New England	125,000	63,650	47,330	14,060	974
Connecticut	24,300	10,940	11,870	1,450	787
Maine	9,400	4,700	2,980	1,780	722
Massachusetts	61,900	32,580	19,870	9,460	1,122
New Hampshire	12,200	7,040	4,330	840	892
Rhode Island	11,100	4,450	6,230	410	1,181
Vermont	6,100	3,940	2,050	120	978
Middle Atlantic	310,500	165,570	105,060	39,830	913
New Jersey	66,400	37,270	23,300	5,790	886
New York	144,400	77,200	46,640	20,520	942
Pennsylvania	99,700	51,100	35,120	13,520	891
South Atlantic	325,400	205,460	90,550	29,280	659
Delaware	6,400	4,420	970	1,020	971
District of Columbia	8,500	3,400	1,170	3,880	2,102
Florida	118,800	74,340	33,130	11,320	678
Georgia	42,600	28,440	8,610	5,510	617
Maryland	37,400	25,300	10,700	1,360	805
North Carolina	44,700	28,120	12,870	3,700	645
South Carolina	17,700	10,470	5,870	1,320	455
Virginia	34,700	21,900	12,300	540	538
West Virginia	14,600	9,070	4,930	630	736
East South Central	104,300	56,420	39,730	8,140	619
Alabama	30,400	15,070	14,090	1,200	694
Kentucky	23,800	14,600	8,150	1,030	561
Mississippi	15,100	7,480	6,410	1,210	523
Tennessee	35,000	19,270	11,080	4,700	654
West South Central	175,400	90,940	68,810	14,640	537
Arkansas	15,100	12,280	2,540	320	546
Louisiana	20,300	10,360	8,040	1,920	401
Oklahoma	15,900	8,470	6,190	1,200	415
Texas	124,100	59,830	53,040	11,200	590
East North Central	300,700	177,430	93,170	30,090	729
Illinois	79,900	47,090	25,940	6,830	714
Indiana	35,400	16,920	12,110	6,390	631
Michigan	73,300	41,680	20,480	11,150	803
Ohio	81,100	54,160	23,240	3,670	793
Wisconsin	31,000	17,580	11,400	2,050	608
West North Central	136,700	84,740	39,230	12,530	762
Iowa	23,100	15,680	5,000	2,400	805
Kansas	19,600	12,190	5,300	2,080	782
Minnesota	33,700	22,270	8,000	3,380	756
Missouri	36,700	20,540	13,010	3,110	719
Nebraska	12,800	6,750	4,510	1,540	785
North Dakota	5,300	4,010	1,230	20	780
South Dakota	5,500	3,300	2,180	0	789
Mountain	90,600	47,680	34,180	8,690	464
Arizona	26,700	15,330	9,290	2,060	478
Colorado	20,600	10,710	6,940	3,000	456
Idaho	4,700	3,000	1,610	60	330
Montana	5,800	1,820	3,520	420	621
Nevada	9,500	6,420	1,950	1,130	521
New Mexico	11,700	5,480	5,650	540	666
Utah	7,500	3,740	3,220	570	287
Wyoming	4,100	1,180	2,000	910	464
Pacific	230,800	135,660	77,530	17,630	538
Alaska	4,500	3,620	860	0	662
California	154,700	90,660	52,200	11,800	491
Hawaii	7,700	5,420	2,080	250	606
Oregon	22,500	14,400	7,740	340	601
Washington	41,400	21,560	14,650	5,240	724

Estimated number may not add to total due to rounding.

[1]Series A projections assume a more constrained trend in basic baccalaureate nursing programs and continuation of trends in other basic nursing programs.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in Projections of the Population of the United States by Age, Sex, and Race: 1983-2080, Series P-25, No. 952, May 1984.

SOURCE: Estimates prepared by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, 1987.

Table 10-27. PROJECTED FULL-TIME EQUIVALENT SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA DECEMBER 31, 2000, (SERIES B)[1]

Geographic Area	Total FTE RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]
United States	1,840,100	1,021,700	643,530	174,820	688
New England	128,600	64,300	50,310	14,060	1,002
Connecticut	25,500	11,280	12,750	1,450	826
Maine	9,600	4,670	3,200	1,780	737
Massachusetts	63,100	32,640	21,030	9,460	1,143
New Hampshire	12,800	7,420	4,550	840	935
Rhode Island	11,400	4,360	6,630	410	1,213
Vermont	6,200	3,930	2,150	120	995
Middle Atlantic	316,900	163,390	113,750	39,810	932
New Jersey	67,200	37,060	24,360	5,790	896
New York	146,800	74,500	51,830	20,510	958
Pennsylvania	102,900	51,830	37,560	13,510	920
South Atlantic	331,400	205,210	97,010	29,250	671
Delaware	6,600	4,490	1,070	1,020	1,002
District of Columbia	8,500	3,390	1,260	3,880	2,102
Florida	120,200	73,930	34,960	11,310	686
Georgia	44,200	29,400	9,290	5,510	640
Maryland	37,700	24,880	11,490	1,350	811
North Carolina	45,600	27,660	14,200	3,700	658
South Carolina	18,200	10,570	6,350	1,320	467
Virginia	35,700	21,930	13,230	530	554
West Virginia	14,700	8,960	5,160	630	741
East South Central	110,200	58,350	43,690	8,140	654
Alabama	33,500	16,820	15,470	1,200	764
Kentucky	24,600	14,780	8,800	1,030	580
Mississippi	16,100	7,530	7,360	1,210	557
Tennessee	36,000	19,220	12,60	4,700	673
West South Central	183,600	92,700	76,260	14,640	562
Arkansas	15,500	12,480	2,720	320	561
Louisiana	22,700	11,210	9,570	1,920	448
Oklahoma	16,100	8,380	6,510	1,200	420
Texas	129,300	60,630	57,460	11,200	615
East North Central	300,400	169,660	100,590	30,060	728
Illinois	82,400	47,740	27,860	6,830	737
Indiana	37,100	17,470	13,270	6,380	661
Michigan	71,200	37,550	22,470	11,140	780
Ohio	78,100	50,370	24,020	3,660	764
Wisconsin	31,600	16,530	12,970	2,050	619
West North Central	139,000	84,180	42,220	12,530	775
Iowa	23,000	15,140	5,480	2,400	801
Kansas	20,200	12,380	5,720	2,080	806
Minnesota	34,200	22,060	8,720	3,380	767
Missouri	37,500	20,510	13,830	3,110	735
Nebraska	13,100	6,720	4,810	1,540	803
North Dakota	5,400	4,070	1,340	20	794
South Dakota	5,600	3,300	2,320	0	803
Mountain	93,100	48,040	36,270	8,690	477
Arizona	27,600	15,600	9,980	2,060	494
Colorado	21,000	10,690	7,310	3,000	465
Idaho	4,800	2,990	1,710	60	337
Montana	6,100	1,830	3,820	420	653
Nevada	9,600	6,400	2,040	1,130	527
New Mexico	12,000	5,480	5,980	540	683
Utah	7,800	3,870	3,330	570	298
Wyoming	4,200	1,180	2,100	910	476
Pacific	236,800	135,870	83,460	17,630	552
Alaska	4,500	3,610	910	0	662
California	159,100	90,920	56,410	11,800	505
Hawaii	7,800	5,420	2,180	250	613
Oregon	23,000	14,440	8,250	340	615
Washington	42,400	21,480	15,710	5,240	741

Estimated number may not add to total due to rounding.

[1]Series B projections assume a continuation of trends in basic programs of the past few years.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in State Population and Household Estimates to 1985 with Age and Components of Change, Series P-25, No. 998, December 1986, and Projections of the United States by Age, Sex, and Race: 1983 to 2080, Series P-25, No. 952, May 1984.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-28. PROJECTED FULL TIME EQUIVALENT SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2020 (SERIES A)[1]

Geographic area	Total FTE RNs	Associate Degree & Diploma	Bacca-laureate	Master's & Doctoral	RNs per 100,000 population[2]
United States	1,806,400	856,060	635,480	314,900	671
New England	115,500	35,300	55,840	24,410	810
Connecticut	21,200	4,180	14,720	2,290	630
Maine	11,300	3,880	3,680	3,770	756
Massachusetts	51,300	15,390	19,930	16,020	844
New Hampshire	13,100	6,250	5,240	1,630	841
Rhode Island	12,100	1,950	9,670	490	1,131
Vermont	6,500	3,650	2,600	210	942
Middle Atlantic	295,800	113,720	110,860	71,220	806
New Jersey	69,700	34,400	24,260	11,050	836
New York	129,100	55,450	38,960	34,670	795
Pennsylvania	97,000	23,870	47,640	25,500	801
South Atlantic	352,800	182,420	114,170	56,200	626
Delaware	7,200	4,180	910	2,160	927
District of Columbia	9,800	2,600	710	6,480	2,121
Florida	148,600	73,080	50,200	25,310	716
Georgia	41,600	22,460	9,580	9,520	543
Maryland	35,900	23,500	10,480	1,890	698
North Carolina	45,800	23,380	15,560	6,820	589
South Carolina	16,900	7,630	7,150	2,130	383
Virginia	31,400	18,140	12,460	840	437
West Virginia	15,600	7,450	7,120	1,050	713
East South Central	101,200	47,950	40,030	13,140	537
Alabama	25,500	8,430	15,440	1,600	522
Kentucky	25,800	16,920	7,460	1,370	543
Mississippi	14,500	7,030	5,750	1,710	446
Tennessee	35,400	15,570	11,380	8,460	594
West South Central	193,000	86,010	78,750	28,210	528
Arkansas	15,100	11,540	3,060	500	479
Louisiana	17,400	8,340	5,330	3,690	308
Oklahoma	17,400	6,810	8,410	2,190	401
Texas	143,100	59,320	61,950	21,820	612
East North Central	282,600	139,440	87,150	55,850	644
Illinois	65,900	31,170	23,570	11,140	556
Indiana	37,700	12,460	11,120	14,080	618
Michigan	74,000	36,080	16,270	21,620	788
Ohio	77,300	47,960	23,470	5,860	712
Wisconsin	27,700	11,810	12,720	3,150	488
West North Central	133,000	73,960	35,490	23,550	683
Iowa	22,500	14,240	3,370	4,870	716
Kansas	18,700	8,870	6,270	3,550	682
Minnesota	32,600	21,800	4,730	6,100	694
Missouri	36,200	18,400	11,620	6,200	653
Nebraska	13,300	4,380	6,100	2,830	732
North Dakota	4,800	3,740	1,080	0	630
South Dakota	4,900	2,530	2,320	0	638
Mountain	96,000	44,880	35,850	15,250	426
Arizona	27,800	14,540	9,820	3,460	422
Colorado	18,100	9,560	3,590	4,900	357
Idaho	4,500	2,680	1,820	0	277
Montana	6,700	1,060	5,050	630	621
Nevada	12,800	7,640	2,450	2,740	586
New Mexico	13,600	5,350	7,380	840	694
Utah	7,200	2,990	3,250	960	242
Wyoming	5,300	1,060	2,490	1,720	511
Pacific	236,700	132,360	77,340	27,080	498
Alaska	4,100	3,120	1,000	0	541
California	154,100	90,010	46,600	17,510	442
Hawaii	7,500	5,090	2,150	300	518
Oregon	24,500	12,240	11,780	510	578
Washington	46,500	21,900	15,810	8,760	746

Estimated number may not add to total due to rounding.

[1]Series A projections assume a more constrained trend in basic baccalaureate nursing programs and continuation of trends in other basic nursing programs.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in Projections of the Population of the United States by Age, Sex, and Race: 1983-2080, Series P-25, No. 952, May 1984.

SOURCE: Estimates prepared by Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, Department of Health and Human Services, 1987.

Table 10-29. PROJECTED FULL-TIME EQUIVALENT SUPPLY OF REGISTERED NURSES BY EDUCATIONAL PREPARATION AND GEOGRAPHIC AREA, DECEMBER 31, 2020, (SERIES B)[1]

Geographic Area	Total FTE RNs	Associate degree & diploma	Bacca-laureate	Master's & doctoral	RNs per 100,000 population[2]
United States	1,945,300	839,740	790,880	314,740	657
New England	128,900	37,430	67,090	24,410	904
Connecticut	25,600	5,140	18,170	2,290	760
Maine	11,900	3,800	4,350	3,770	796
Massachusetts	55,400	15,400	24,010	16,020	912
New Hampshire	15,500	7,680	6,230	1,630	995
Rhode Island	13,600	1,810	11,270	490	1,271
Vermont	6,900	3,600	3,060	210	1,000
Middle Atlantic	317,300	108,280	37,880	71,180	865
New Jersey	73,900	33,840	28,980	11,040	886
New York	136,000	48,620	52,770	34,650	837
Pennsylvania	107,400	25,810	56,130	25,490	886
South Atlantic	374,300	181,180	17,060	56,170	664
Delaware	7,600	4,380	1,110	2,160	979
District of Columbia	9,900	2,570	900	6,480	2,143
Florida	154,600	71,650	57,650	25,280	745
Georgia	46,400	24,940	11,970	9,520	605
Maryland	37,500	22,410	13,170	1,890	730
North Carolina	49,200	22,010	20,340	6,820	633
South Carolina	18,500	7,840	8,550	2,130	419
Virginia	34,400	18,170	15,410	840	479
West Virginia	16,200	7,210	7,960	1,050	741
East South Central	116,600	52,350	51,100	13,140	619
Alabama	33,300	12,520	19,160	1,600	682
Kentucky	27,800	17,260	9,180	1,370	585
Mississippi	17,200	7,130	8,400	1,710	530
Tennessee	38,300	15,440	14,360	8,460	642
West South Central	219,600	91,020	100,370	28,200	601
Arkansas	16,300	12,190	3,650	500	517
Louisiana	26,400	11,500	11,190	3,690	467
Oklahoma	18,300	6,570	9,540	2,190	422
Texas	158,600	60,760	75,990	21,820	678
East North Central	282,400	118,650	107,890	55,820	644
Illinois	72,600	32,340	29,090	11,130	612
Indiana	41,800	13,440	14,300	14,070	685
Michigan	70,200	26,790	21,820	21,610	748
Ohio	68,900	37,360	25,660	5,860	635
Wisconsin	28,900	8,720	17,020	3,150	509
West North Central	140,700	72,820	44,400	23,530	723
Iowa	22,600	13,120	4,640	4,860	720
Kansas	20,400	9,340	7,540	3,550	744
Minnesota	33,900	21,390	6,410	6,100	722
Missouri	39,300	18,280	14,820	6,200	709
Nebraska	14,100	4,300	7,020	2,820	776
North Dakota	5,200	3,860	1,300	0	683
South Dakota	5,200	2,530	2,670	0	677
Mountain	104,500	45,560	43,670	15,250	464
Arizona	30,600	15,150	11,990	3,460	464
Colorado	19,500	9,450	5,180	4,900	384
Idaho	4,900	2,660	2,190	0	301
Montana	7,800	1,080	6,060	630	723
Nevada	13,100	7,560	2,780	2,740	600
New Mexico	15,000	5,340	8,850	840	765
Utah	7,900	3,260	3,700	960	266
Wyoming	5,700	1,060	2,920	1,720	549
Pacific	260,800	132,430	100,330	27,070	549
Alaska	4,300	3,090	1,190	0	567
California	171,400	90,420	63,490	17,510	492
Hawaii	7,900	5,060	2,530	300	546
Oregon	26,600	12,280	13,810	510	628
Washington	50,600	21,580	20,310	8,750	811

Estimated number may not add to total due to rounding.

[1]Series B projections assume a continuation of trends in basic programs of the past few years.

[2]Population data used for computation of nurse-population ratios are based on projections from the Census, U.S. Department of Commerce as reported in State Population and Household Estimates to 1985 with Age and Components of Change, Series P-25, No. 998, December 1986, and Projections of the Population of the United States by Age, Sex, and Race: 1983 to 2080, Series P-25, No. 952, May 1984.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-30. PROJECTED REQUIREMENTS FOR FULL-TIME EQUIVALENT REGISTERED NURSES AND LICENSED PRACTICAL/VOCATIONAL NURSES FOR THE BASELINE CASE AND THE CASE MANAGEMENT ALTERNATIVE[1] FROM THE HISTORICAL TREND-BASED MODEL FOR 1985 - 2020

As of December 31	Baseline		Case Management[1]	
	RNs	LP/VNs	RNs	LP/VNs
1985	1,261,830	494,770	1,261,830	494,770
1986	1,266,840	471,010	1,265,340	470,610
1987	1,311,610	481,430	1,306,810	480,150
1988	1,356,830	490,550	1,348,000	488,260
1989	1,400,660	499,110	1,387,080	495,700
1990	1,442,060	507,020	1,422,730	502,330
1991	1,481,070	514,010	1,454,820	507,890
1992	1,518,490	521,100	1,484,680	513,510
1993	1,552,780	528,150	1,511,390	519,270
1994	1,583,830	534,800	1,534,890	524,780
1995	1,612,930	541,830	1,556,730	530,790
1996	1,640,080	549,230	1,576,850	537,270
1997	1,666,500	557,270	1,596,040	544,430
1998	1,691,290	565,790	1,613,790	552,156
1999	1,716,760	575,090	1,632,070	560,700
2000	1,743,010	585,400	1,650,530	570,190
2001	1,767,680	595,380	1,655,658	576,720
2002	1,787,350	605,200	1,657,140	583,420
2003	1,801,870	614,940	1,653,980	590,060
2004	1,833,250	628,130	1,665,960	600,080
2005	1,870,550	642,630	1,680,970	610,860
2006	1,899,590	656,580	1,690,070	621,570
2007	1,929,190	671,160	1,699,830	633,010
2008	1,959,320	686,330	1,710,770	645,290
2009	1,989,660	702,110	1,720,660	657,900
2010	2,022,310	718,680	1,733,230	671,570
2011	2,056,860	736,020	1,745,420	685,670
2012	2,092,040	753,960	1,758,350	700,500
2013	2,127,920	772,520	1,771,560	715,870
2014	2,164,440	791,750	1,785,340	731,970
2015	2,201,940	811,680	1,797,210	748,170
2016	2,240,490	832,290	1,809,530	765,100
2017	2,279,800	833,560	1,821,460	782,570
2018	2,319,830	875,480	1,835,420	801,070
2019	2,360,580	898,060	1,848,400	819,950
2020	2,401,690	921,270	1,860,970	839,360

[1]The Case Management Alternative represents centrally managed care of all the health care needs of an individual or group of individuals and is assumed to take place in an HMO or PPA environment.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professons, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-31. PROJECTED REQUIREMENTS OF FULL-TIME EQUIVALENT REGISTERED NURSES AND LICENSED PRACTICAL/VOCATIONAL NURSES FOR THE BASELINE CASE FROM THE HISTORICAL TREND-BASED MODEL BY AREA OF PRACTICE AS OF DECEMBER 31, 1985-2020

Area of practice	1985	1990	1995	2000	2005	2010	2015	2020
Total								
RNs	1,261,830	1,442,060	1,612,930	1,743,010	1,870,050	2,022,310	2,201,940	2,401,690
LP/VNs	494,770	507,020	541,830	585,400	642,630	718,680	811,680	921,270
Hospital								
RNs	858,160	960,140	1,057,150	1,113,350	1,171,250	1,244,510	1,335,840	1,439,310
LP/VNs	280,440	233,910	208,290	184,040	168,500	159,700	155,590	154,110
Nursing Home								
RNs	95,780	108,570	121,790	135,570	151,940	172,070	195,320	222,320
LP/VNs	118,350	145,630	174,720	206,460	243,320	287,280	338,350	398,080
Nursing Education								
RNs	34,800	34,080	34,990	35,390	34,760	34,440	34,510	34,960
LP/VNs	—	—	—	—	—	—	—	—
Community health								
RNs	152,900	190,640	229,240	268,210	309,520	355,820	408,720	465,790
LP/VNs	21,320	34,430	51,090	71,250	95,060	122,680	154,210	189,490
Physician's office								
RNs	79,850	104,780	121,830	138,160	146,180	153,830	161,120	168,040
LP/VNs	49,900	68,110	81,930	96,630	107,340	119,090	13,200	146,400
Other								
RNs	40,340	43,860	47,930	52,320	56,910	61,620	66,420	71,270
LP/VNs	24,750	24,940	25,800	27,010	28,410	29,930	31,530	33,190

Figures may not add to total due to rounding.

SOURCE: Estimates by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-32. PROJECTED REQUIREMENTS OF FULL-TIME EQUIVALENT REGISTERED NURSES AND LICENSED PRACTICAL/VOCATIONAL NURSES FOR THE CASE MANAGEMENT[1] ALTERNATIVE FROM THE HISTORICAL TREND-BASED MODEL BY AREA OF PRACTICE AS OF DECEMBER 31, 1985-2020

Area of practice	1985	1990	1995	2000	2005	2010	2015	2020
Total								
RNs	1,261,830	1,422,730	1,556,730	1,650,530	1,680,970	1,733,230	1,797,210	1,860,970
LP/VNs	494,770	502,330	530,790	570,190	610,860	671,570	748,170	839,360
Hospital								
RNs	858,160	940,810	1,000,950	1,020,870	982,720	957,820	934,960	904,260
LP/VNs	280,440	229,220	197,250	168,840	141,060	121,980	107,420	94,790
Nursing Home								
RNs	95,780	105,580	121,790	135,580	151,940	172,080	195,320	222,320
LP/VNs	118,350	145,630	174,720	206,460	243,320	287,280	338,350	398,080
Nursing Education								
RNs	34,800	34,080	34,990	35,390	34,760	34,440	34,510	34,960
LP/VNs	—	—	—	—	—	—	—	—
Community health								
RNs	152,900	190,640	229,240	268,210	309,520	355,830	408,720	465,790
LP/VNs	21,320	34,430	51,090	71,260	95,060	122,680	154,210	189,490
Physician's office								
RNs	79,847	104,780	121,840	138,160	145,130	151,450	157,270	162,380
LP/VNs	49,900	68,110	81,930	96,630	103,000	109,700	116,660	123,820
Other								
RNs	40,340	43,860	47,930	52,330	56,910	61,630	66,420	71,270
LP/VNs	24,750	24,940	25,800	27,010	28,410	29,930	31,530	33,190

Figures may not add to total due to rounding.

[1]The Case Management Alternative represents centrally managed care of all the health care needs of an individual or group of individuals and is assumed to take place in an HMO or PPA environment.

SOURCE: Estimates by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-33. HISTORICAL TREND-BASED MODEL PROJECTIONS FOR THE BASELINE CASE FOR FULL-TIME EQUIVALENT REGISTERED NURSE AND LICENSED PRACTICAL/VOCATIONAL NURSE REQUIREMENTS FOR 2000 AND 2020 BY GEOGRAPHIC AREA.

Geographic area	2000		2020	
	RN	LP/VN	RN	LP/VN
United States	1,743,030	585,400	2,401,710	921,280
New England	113,180	30,060	163,560	42,920
Connecticut	25,960	6,100	39,730	8,360
Maine	10,250	3,350	14,150	5,180
Massachusetts	53,440	13,180	72,960	16,810
New Hampshire	9,400	2,760	14,350	4,500
Rhode Island	8,690	2,620	13,850	4,320
Vermont	5,440	2,040	8,520	3,740
Middle Atlantic	276,490	73,670	379,360	99,980
New Jersey	58,200	12,770	83,330	17,610
New York	124,430	37,340	168,600	52,280
Pennsylvania	93,860	23,570	127,430	30,090
South Atlantic	314,060	106,510	436,290	170,160
Delaware	4,430	1,250	6,220	2,170
District of Columbia	7,730	1,750	10,820	2,430
Florida	108,250	27,460	155,020	35,700
Georgia	48,560	23,780	70,610	43,720
Maryland	31,110	8,340	43,180	13,370
North Carolina	44,540	18,840	57,020	32,580
South Carolina	20,140	7,650	29,380	12,380
Virginia	37,670	12,190	47,670	16,890
West Virginia	11,630	5,230	16,360	10,910
East South Central	109,870	51,480	157,420	93,350
Alabama	31,100	11,850	43,440	16,620
Kentucky	22,820	11,740	37,680	24,710
Mississippi	16,800	9,240	24,680	19,100
Tennessee	39,150	18,650	51,620	32,920
West South Central	185,120	87,750	260,550	157,450
Arkansas	18,630	8,920	27,200	13,830
Louisiana	29,660	23,530	47,920	62,030
Oklahoma	21,840	10,900	30,960	25,270
Texas	114,990	44,400	154,480	56,320
East North Central	291,800	89,350	384,770	129,650
Illinois	81,940	21,720	104,770	29,220
Indiana	39,750	13,640	55,750	21,960
Michigan	60,360	17,400	77,770	21,090
Ohio	75,110	22,040	97,060	28,390
Wisconsin	34,640	14,540	49,430	28,990
West North Central	127,860	49,580	175,520	82,250
Iowa	25,100	8,100	36,340	11,890
Kansas	16,150	5,500	20,280	8,530
Minnesota	27,300	13,300	38,130	24,060
Missouri	36,660	13,870	49,230	22,690
Nebraska	11,190	4,030	14,370	6,140
North Dakota	6,540	3,260	10,020	6,900
South Dakota	4,920	1,480	7,160	2,030
Mountain	103,810	30,000	155,140	51,150
Arizona	29,850	8,530	44,060	13,640
Colorado	26,540	5,830	39,290	8,030
Idaho	6,250	2,370	9,010	4,810
Montana	5,090	1,370	7,810	1,980
Nevada	10,120	1,810	15,990	2,490
New Mexico	9,630	3,840	14,290	7,610
Utah	11,070	4,810	15,760	9,750
Wyoming	5,260	1,430	8,930	2,830
Pacific	220,840	66,980	289,090	94,360
Alaska	4,650	870	6,400	1,070
California	156,130	51,690	200,730	75,210
Hawaii	8,450	2,610	12,290	4,010
Oregon	17,370	4,060	24,320	4,820
Washington	34,230	7,750	45,340	9,250

Figures may not add to totals due to rounding.

SOURCE: Projections by the Division of Nursing, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-34. HISTORICAL TREND-BASED MODEL PROJECTIONS FOR THE CASE MANAGEMENT ALTERNATIVE[1] FOR FULL-TIME EQUIVALENT REGISTERED NURSE AND LICENSED PRACTICAL/VOCATIONAL NURSE REQUIREMENTS FOR 2000 AND 2020 BY GEOGRAPHIC AREA

Geographic area	2000		2020	
	RN	LP/VN	RN	LP/VN
United States	1,650,540	570,190	1,860,980	839,370
New England	106,180	28,790	136,550	39,580
Connecticut	24,860	5,920	33,360	7,610
Maine	10,250	3,350	14,140	5,170
Massachusetts	48,680	12,300	57,330	14,880
New Hampshire	9,130	2,720	12,520	4,300
Rhode Island	8,110	2,520	11,690	4,080
Vermont	5,150	1,980	7,500	3,530
Middle Atlantic	258,510	70,750	284,290	89,560
New Jersey	55,090	12,240	66,580	15,550
New York	115,890	35,980	125,250	47,710
Pennsylvania	87,520	22,530	92,460	26,300
South Atlantic	298,410	103,940	318,210	151,810
Delaware	4,190	1,220	4,900	2,010
District of Columbia	6,710	1,600	8,200	2,200
Florida	99,500	26,090	105,680	30,960
Georgia	47,970	23,640	56,050	39,410
Maryland	29,760	8,100	35,790	12,510
North Carolina	43,850	18,700	39,520	28,110
South Carolina	19,450	7,530	21,770	11,370
Virginia	37,130	12,100	34,810	14,970
West Virginia	9,860	4,950	11,480	10,270
East South Central	106,650	50,910	110,350	83,710
Alabama	30,800	11,790	29,890	13,850
Kentucky	22,730	11,720	29,280	23,640
Mississippi	14,400	8,810	17,810	17,670
Tennessee	38,720	18,590	33,370	28,550
West South Central	181,400	87,130	197,810	141,330
Arkansas	18,590	8,910	22,280	12,670
Louisiana	29,550	23,500	34,140	59,070
Oklahoma	21,600	10,850	23,470	18,910
Texas	111,660	43,870	117,900	50,680
East North Central	265,870	85,250	296,070	120,110
Illinois	74,290	20,580	78,160	26,840
Indiana	37,850	13,340	43,310	20,190
Michigan	53,670	16,340	58,510	18,990
Ohio	68,040	20,920	75,120	26,420
Wisconsin	32,020	14,060	40,970	27,670
West North Central	119,860	48,220	133,650	75,740
Iowa	24,320	7,950	28,920	10,620
Kansas	14,960	5,330	13,430	7,740
Minnesota	25,620	13,030	32,920	22,690
Missouri	33,020	13,260	34,680	20,990
Nebraska	11,000	4,000	10,080	5,560
North Dakota	6,460	3,240	7,940	6,290
South Dakota	4,480	1,410	5,680	1,840
Mountain	99,790	29,360	134,810	48,400
Arizona	28,290	8,280	36,690	12,820
Colorado	25,240	5,630	33,970	7,470
Idaho	6,180	2,360	8,210	4,700
Montana	4,880	1,330	7,100	1,870
Nevada	9,420	1,710	12,730	2,220
New Mexico	9,550	3,820	12,860	6,960
Utah	10,960	4,790	14,310	9,520
Wyoming	5,260	1,430	8,930	2,830
Pacific	213,870	65,840	249,250	89,130
Alaska	4,650	870	6,400	1,070
California	149,780	50,650	169,730	71,120
Hawaii	8,440	2,610	11,400	3,810
Oregon	17,120	4,020	21,960	4,480
Washington	33,880	7,690	39,750	8,650

Figures may not add to totals due to rounding.
[1]The Case Management Alternative represents centrally managed care of all the health care needs of an individual or group of individuals and is assumed to take place in an HMO or PPA environment.

SOURCE: Projections by the Division of Nursing, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel)

Type of Employment	LOWER BOUND							UPPER BOUND						
	Criteria for Staffing			Criteria for RN Educational Preparation				Criteria for Staffing			Criteria for RN Educational Preparation			
				AD/DIP %	Bacc %	Master's %	Doctoral %				AD/DIP %	Bacc %	Master's %	Doctoral %
DIRECT CLIENT CARE														
Hospitals - Inpatient Services	RNs	LPNs	Aides					RNs	LPNs	Aides				
	Per 100 patients							Per 100 patients						
Critical care	365.0	0.0	0.0	40	50	10	--	486.7	0.0	0.0	20	60	20	--
Acute/complex care	243.3	0.0	0.0	40	50	10	--	283.9	0.0	0.0	20	60	20	--
General care	78.1	11.2	22.3	50	45	5	--	105.4	6.6	19.8	40	55	5	--
Rehabilitation care	78.1	11.2	22.3	50	45	5	--	105.4	6.6	19.8	40	55	5	--
Short-term psychiatric care	73.0	0.0	18.3	15	70	15	--	89.2	0.0	22.3	5	75	20	--
Long-term psychiatric care	15.8	0.0	36.9	50	45	5	--	18.9	0.0	44.0	50	45	5	--
Hospitals-Other Services[1]	RNs	LPNs	Aides					RNs	LPNs	Aides				
	Per 1000 operations							Per 1000 operations						
Operating room	1.67	0.0	0.56	60	40	--	--	2.44	0.0	0.61	60	40	--	--
	Per 1000 visits							Per 1000 visits						
Emergency services	0.83	0.0	0.28	50	50	--	--	1.11	0.0	0.28	40	60	--	--
	Per 1000 visits							Per 1000 visits						
Outpatient services	0.07	0.01	0.03	--	80	20	--	0.14	0.01	0.07	--	80	20	--
Nursing Homes	RNs	LPNs	Aides					RNs	LPNs	Aides				
	Per 100 residents							Per 100 residents						
Functionally dependent with complex needs	78.1	0.0	33.5	50	45	5	--	98.9	0.0	33.0	40	55	5	--
Functionally dependent but stable	10.6	17.7	42.6	50	45	5	--	11.4	19.0	45.6	50	45	5	--
Functionally assisted	7.6	12.7	30.4	50	45	5	--	8.4	13.9	33.5	50	45	5	--
Ambulatory Care Settings														
Health Maintenance Organizations	4.5 RNs per 10 MDs (10 RNs/0 LPNs/2.5 Aides)			25	45	30	--	5 RNs per 10 MDs (10 RNs/0 LPNs/3 Aides)			25	45	30	--
Preferred Provider Organizations (or other physician-based settings)	5 RNs per 10 MDs (10 RNs/0 LPNs/2.5 Aides)			25	45	30	--	7.5 RNs per 10 MDs (10 RNs/0 LPNs/3 Aides)			25	45	30	--
Nurse managed care centers	1 RN per 250,000 population			--	--	90	10	1 RN per 250,000 population			--	--	90	10

[1]Excludes home care listed under "Community health".

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel) -- Continued

Type of Employment	LOWER BOUND Criteria for Staffing	LOWER BOUND Criteria for RN Educational Preparation AD/DIP %	Bacc %	Master's %	Doctoral %	UPPER BOUND Criteria for Staffing	UPPER BOUND Criteria for RN Educational Preparation AD/DIP %	Bacc %	Master's %	Doctoral %
DIRECT CLIENT CARE (continued)										
Community Health										
I. Home visits										
A. Home health care	7 visits/RN per day (1 RN/0 LPNs/2 Aides)	--	70	30	--	5 visits/RN per day (1 RN/0 LPNs/3 Aides)	--	70	30	--
	for									
	23% of number of hospital discharges									
	15% for acute post-hospital care					(11 RN visits/person/year)				
	8% for other post-hospital care					(5 RN visits/person/year)				
	7% of number of ambulatory surgery					(5 RN visits/person/year)				
	2% of persons aged 65 to 74					(7 RN visits/person/year)				
	5% of persons aged 75 to 84					(12 RN visits/person/year)				
	10% of persons aged 85 and over					(15 RN visits/person/year)				
	15% of 3% of population who are disabled					(7 RN visits/person/year)				
B. Health promotion/disease prevention visits for high risk groups	7 visits/RN per day (4 RN visits/person/year)	--	70	30	--	5 visits/RN per day (4 RN visits/person/year)	--	70	30	--
	for									
	1. Maternal/child health									
	a. Infant deaths (one month to one year)									
	b. 20% of live births (mothers/infants at high risk)									
	c. 15% of preschoolers in families with economic levels up to 150% above the poverty level									
	2. Mental health									
	a. Abused population (5% of the reported abused population including child, spouse, elderly)									
	b. Alcoholism and substance abuse (1% of reported cases)									
	c. Chronic mental illness (2% of diagnosed cases)									
	3. Communicable disease									
	a. 10% of reported active TB cases									
	b. 1% of reported hepatitis cases									
	c. 2% of reported sexually-transmitted diseases cases (except AIDS/ARC cases)									
	d. 15% of reported AIDS/ARC cases									
	4. Chronic illness									
	2% of population 17 years and older for general chronic illness (hypertension, diabetes, cancer, etc.)									
	5. Environmental									
	1% of total population									

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel) -- Continued

Type of Employment	LOWER BOUND					UPPER BOUND				
	Criteria for Staffing	Criteria for RN Educational Preparation				Criteria for Staffing	Criteria for RN Educational Preparation			
		AD/DIP %	Bacc %	Master's %	Doctoral %		AD/DIP %	Bacc %	Master's %	Doctoral %
DIRECT CLIENT CARE (Continued)										
Community Health (Continued)										
II. Clinic visits										
A. Community primary care clinics	3 visits/RN per hour (10 RNs/0 LPNs/2 Aides)	--	70	30	--	3 visits/RN per hour (10 RNs/0 LPNs/3 Aides)	--	70	30	--
B. Community mental health clinics	6 visits/RN per day	--	--	100	--	6 visits/RN per day	--	--	100	--
III. Occupational Health										
A. In-plant services in plants with 300 and over employees										
1. Industrial settings	1 RN per 300 (to 1000 employees) 1 RN per each additional 1000 employees	--	70	30	--	1 RN per 300 (to 1000 employees) 1 RN per each additional 1000 employees	--	70	30	--
2. Non-industrial settings	1 RN per 750 (to 1000 employees) 1 RN per each additional 1000 employees	--	70	30	--	1 RN per 750 (to 1000 employees) 1 RN per each additional 1000 employees	--	70	30	--
B. Plant settings with less than 300 employees	1 RN per 625 employees	--	70	30	--	1 RN per 400 employees	--	70	30	--
IV. School health										
A. General school population (grades 1-12)	1 RN per 750 students (1 RN/0 LPNs/1 Aide)	--	70	30	--	1 RN per 750 students (1 RN/0 LPNs/2 Aides)	--	70	30	--
B. Mainstreamed students	1 RN per 225 students	--	70	30	--	1 RN per 225 students	--	70	30	--
C. Severely handicapped students	1 RN per 125 students	--	70	30	--	1 RN per 125 students	--	70	30	--
D. College or university students	1 RN per 1000 students	--	70	30	--	1 RN per 1000 students	--	70	30	--
V. Correctional facilities										
A. Adult	1 RN per 60 inmates	--	70	30	--	1 RN per 60 inmates	--	70	30	--
B. Juvenile	1 RN per 40 inmates	--	70	30	--	1 RN per 40 inmates	--	70	30	--
C. Infirmaries	1 RN per 20 patients	--	70	30	--	1 RN per 20 patients	--	70	30	--
VI. Adult day care centers	1 RN per 40 clients	--	70	30	--	1 RN per 30 clients	--	70	30	--
VII. Congregate living settings	1 RN per 100 clients	--	70	30	--	1 RN per 75 clients	--	70	30	--
VIII. Licensure & regulation	1 RN per 250,000 population	--	--	90	10	1 RN per 250,000 population	--	--	90	10

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel) -- Continued

Type of Employment	LOWER BOUND					UPPER BOUND				
	Criteria for Staffing	Criteria for RN Educational Preparation				Criteria for Staffing	Criteria for RN Educational Preparation			
		AD/DIP %	Bacc %	Master's %	Doctoral %		AD/DIP %	Bacc %	Master's %	Doctoral %
ADMINISTRATIVE POSITIONS (Continued)										
II. Mid-level nurse administrators/managers										
A. Hospitals	1 head nurse per 36 beds	--	50	50	--	1 head nurse per 36 beds	--	50	50	--
	3 coordinators/supervisors per 200 beds	--	75	25	--	3 coordinators/supervisors per 200 beds	--	75	25	--
B. Nursing homes	1 RN per 50 beds	--	50	50	--	1 RN per 50 beds	--	50	50	--
C. Ambulatory care settings	1 RN per 15 OCC RNs	--	--	100	--	1 RN per 10 DCC RNs	--	--	100	--
D. Community health agencies	1 RN per 12 OCC RNs	--	--	98	2	1 RN per 12 DCC RNs	--	--	98	2
E. Home health agencies	1 RN per 12 DCC RNs	--	--	98	2	1 RN per 12 DCC RNs	--	--	98	2
F. Occupational health settings	1 RN per 40 DCC RNs	--	--	98	2	1 RN per 40 DCC RNs	--	--	98	2
INSERVICE INSTRUCTORS										
Hospitals more than 400 beds	6 RNs per institution	--	--	100	--	10 RNs per institution	--	--	100	--
Hospitals 100-400 beds	3 RNs per institution	--	--	100	--	5 RNs per institution	--	--	100	--
Hospitals less than 100 beds	1 RN per institution	--	25	75	--	1 RN per institution	--	25	75	--
Nursing homes more than 200 beds	2 RNs per institution	--	50	50	--	2 RNs per institution	--	50	50	--
Nursing homes 200 beds or less	1 RN per institution	--	50	50	--	1 RN per institution	--	50	50	--
Community health	1 RN per 75 nursing personnel	--	--	80	20	1 RN per 50 nursing personnel	--	--	80	20
RESEARCHERS										
Hospitals	1 RN per teaching hospital	--	--	--	100	1 RN per teaching hospital	--	--	--	100
Nursing homes[2]	1 RN per 100 OCC RNs	--	--	75	25	1 RN per 100 DCC RNs	--	--	75	25
Ambulatory care settings	1 RN per 300 DCC RNs	--	--	--	100	1 RN per 200 DCC RNs	--	--	--	100
Community health settings	1 RN per 200 DCC RNs	--	--	--	100	1 RN per 100 DCC RNs	--	--	--	100
Occupational health settings	1 RN per 500 OCC RNs	--	--	--	100	1 RN per 500 DCC RNs	--	--	--	100

[2]For nursing homes, includes both researchers and consultants.

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel) -- Continued

Type of Employment	LOWER BOUND					UPPER BOUND				
	Criteria for Staffing	Criteria for RN Educational Preparation				Criteria for Staffing	Criteria for RN Educational Preparation			
		AD/DIP %	Bacc %	Master's %	Doctoral %		AD/DIP %	Bacc %	Master's %	Doctoral %
CLINICAL SPECIALISTS										
Hospitals	1 RN per 200 beds	--	--	100	--	1 RN per 200 beds	--	--	100	--
Nursing Homes	1 RN per 200 beds	--	--	100	--	1 RN per 200 beds	--	--	100	--
ADMINISTRATIVE POSITIONS										
I. Executive/principal nurse administrators										
A. Hospitals										
1. Large teaching hospitals (more than 400 beds)	1 director of nursing per institution	--	--	60	40	1 director of nursing per institution	--	--	60	40
	1 assistant/associate director per 200 beds	--	20	80	--	1 assistant/associate director per 200 beds	--	20	80	--
2. All other hospitals	1 director of nursing per institution	--	18	80	2	1 director of nursing per institution	--	18	80	2
	1 assistant/associate director per 200 beds	--	20	80	--	1 assistant/associate director per 200 beds	--	20	80	--
B. Nursing homes	1 director of nursing per institution	--	50	50	--	1 director of nursing per institution	--	50	50	--
C. Ambulatory care settings	1 director of nursing per 40 DCC RNs	--	--	100	--	1 director of nursing per 40 DCC RNs	--	--	100	--
D. Community health										
1. Community health agencies	2 directors of nursing per agency	--	--	90	10	2 directors of nursing per agency	--	--	90	10
2. Home health agencies	1 director of nursing per agency	--	--	90	10	1 director of nursing per agency	--	--	90	10
3. Occupational health settings	1 director of nursing in firms with 50,000 or more employees	--	--	90	10	1 director of nursing in firms with 50,000 or more employees	--	--	90	10
4. Adult day care centers	1 director of nursing per 20 DCC RNs	--	--	100	--	1 director of nursing per 20 DCC RNs	--	--	100	--

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel) -- Continued

Type of Employment	LOWER BOUND					UPPER BOUND				
	Criteria for Staffing	Criteria for RN Educational Preparation				Criteria for Staffing	Criteria for RN Educational Preparation			
		AD/DIP %	Bacc %	Master's %	Doctoral %		AD/DIP %	Bacc %	Master's %	Doctoral %
Supplementary institutionally-based personnel	0.75 RN per institution	50	50	--	--	0.75 RN per institution	50	50	--	--
Schools of Nursing										
Administrators										
Doctorate, master's, baccalaureate and associate	1 per school and 1 per program (first 200 students), and 1 per each additional 200 students	--	--	--	100	1 per school and 1 per program (first 200 students), and 1 per each additional 200 students	--	--	--	100
Faculty										
Doctorate	1 RN per 6 students	--	--	--	100	1 RN per 4 students	--	--	--	100
Master's	1 RN per 10 students	--	--	--	100	1 RN per 8 students	--	--	--	100
Baccalaureate	1 RN per 10 students	--	--	50	50	1 RN per 8 students	--	--	50	50
Associate	1 RN per 10 students	--	--	90	10	1 RN per 8 students	--	--	90	10
Private duty	1 RN per 10,000 population	80	20	--	--	0.9 RN per 10,000 population	80	20	--	--
Health-related organizations	0.4 RN per 10,000 population	--	--	80	20	0.5 RN per 10,000 population	--	--	80	20

SOURCE: Kearns, Jeanne M., The 1987 Evaluation and Update of the Staffing Criteria for the Criteria-Based Model. Unpublished report, 1987.

Table 10-35. CRITERIA FOR NURSE STAFFING AND RN EDUCATIONAL PREPARATION IN THE CRITERIA-BASED MODEL, 2000
(Full-time Equivalent Nursing Personnel) -- Continued

Type of Employment	LOWER BOUND					UPPER BOUND				
	Criteria for Staffing	Criteria for RN Educational Preparation				Criteria for Staffing	Criteria for RN Educational Preparation			
		AD/DIP %	Bacc %	Master's %	Doctoral %		AD/DIP %	Bacc %	Master's %	Doctoral %
ADMINISTRATIVE POSITIONS (Continued)										
II. Mid-level nurse administrators/managers										
A. Hospitals	1 head nurse per 36 beds	--	50	50	--	1 head nurse per 36 beds	--	50	50	--
	3 coordinators/supervisors per 200 beds	--	75	25	--	3 coordinators/supervisors per 200 beds	--	75	25	--
B. Nursing homes	1 RN per 50 beds	--	50	50	--	1 RN per 50 beds	--	50	50	--
C. Ambulatory care settings	1 RN per 15 OCC RNs	--	--	100	--	1 RN per 10 OCC RNs	--	--	100	--
D. Community health agencies	1 RN per 12 OCC RNs	--	--	98	2	1 RN per 12 OCC RNs	--	--	98	2
E. Home health agencies	1 RN per 12 DCC RNs	--	--	98	2	1 RN per 12 OCC RNs	--	--	98	2
F. Occupational health settings	1 RN per 40 OCC RNs	--	--	98	2	1 RN per 40 DCC RNs	--	--	98	2
INSERVICE INSTRUCTORS										
Hospitals more than 400 beds	6 RNs per institution	--	--	100	--	10 RNs per institution	--	--	100	--
Hospitals 100-400 beds	3 RNs per institution	--	--	100	--	5 RNs per institution	--	--	100	--
Hospitals less than 100 beds	1 RN per institution	--	25	75	--	1 RN per institution	--	25	75	--
Nursing homes more than 200 beds	2 RNs per institution	--	50	50	--	2 RNs per institution	--	50	50	--
Nursing homes 200 beds or less	1 RN per institution	--	50	50	--	1 RN per institution	--	50	50	--
Community health	1 RN per 75 nursing personnel	--	--	80	20	1 RN per 50 nursing personnel	--	--	80	20
RESEARCHERS										
Hospitals	1 RN per teaching hospital	--	--	--	100	1 RN per teaching hospital	--	--	--	100
Nursing homes[2]	1 RN per 100 DCC RNs	--	--	75	25	1 RN per 100 OCC RNs	--	--	75	25
Ambulatory care settings	1 RN per 300 OCC RNs	--	--	--	100	1 RN per 200 DCC RNs	--	--	--	100
Community health settings	1 RN per 200 DCC RNs	--	--	--	100	1 RN per 100 DCC RNs	--	--	--	100
Occupational health settings	1 RN per 500 DCC RNs	--	--	--	100	1 RN per 500 OCC RNs	--	--	--	100

[2]For nursing homes, includes both researchers and consultants.

Table 10-36. PROJECTED REQUIREMENTS FOR FULL-TIME EQUIVALENT NURSING PERSONNEL ACCORDING TO CRITERIA-BASED MODEL, BY FIELD OF EMPLOYMENT, 2000, 2010 AND 2020

Field of employment	Lower Bound			Upper Bound		
	RNs	LP/VNs	Aides	RNs	LP/VNs	Aides
			2000			
Total	1,816,900	291,700	1,072,200	2,269,100	289,900	1,347,100
Hospitals	954,000	52,200	222,300	1,244,900	31,500	235,700
Nursing homes	359,900	239,400	631,000	405,800	258,400	675,500
Nursing education	33,400	—	—	41,200	—	—
Community health[1]	276,100	—	183,300	321,300	—	376,400
Ambulatory care	157,000	—	35,600	218,400	—	59,400
Other	37,600	—	—	37,600	—	—
			2010			
Total	2,711,100	—	1,200,400	3,242,800	—	1,546,300
Hospitals	1,369,800	—	231,400	1,675,200	—	283,300
Nursing homes	816,200	—	738,100	916,200	—	803,300
Nursing education	22,200	—	—	31,200	—	—
Community health[1]	290,400	—	191,700	340,300	—	394,300
Ambulatory care	172,700	—	39,200	240,300	—	65,400
Other	39,700	—	—	39,700	—	—
			2020			
Total	3,431,800	—	1,460,000	4,107,500	—	1,841,500
Hospitals	1,798,300	—	270,600	2,209,800	—	321,500
Nursing homes	1,077,300	—	932,600	1,202,900	—	1,007,300
Nursing education	20,800	—	—	29,300	—	—
Community health[1]	307,400	—	214,500	364,500	—	442,100
Ambulatory care	186,500	—	42,300	259,500	—	70,700
Other	41,500	—	—	41,500	—	—

Figures may not add to total because of rounding.
[1]Includes occupational and school health.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-37. PROJECTED REQUIREMENTS FOR FULL-TIME EQUIVALENT REGISTERED NURSES ACCORDING TO CRITERIA-BASED MODEL BY GEOGRAPHIC AREA AND EDUCATIONAL PREPARATION, 2000

Geographic area	Lower Bound					Upper Bound				
	Total	Associate degree & diploma	Bacca-laureate	Master's	Doctorate	Total	Associate Degree & Diploma	Bacca-laureate	Master's	Doctorate
United States[1]	1,816,870	586,010	853,780	354,870	22,220	2,269,110	584,590	1,172,770	481,530	30,220
New England	100,680	32,510	46,770	20,050	1,360	125,880	32,920	64,170	26,990	1,800
Connecticut	21,690	6,900	10,090	4,380	330	27,240	7,010	13,850	5,940	440
Maine	11,170	3,690	5,220	2,120	140	13,780	3,670	7,140	2,800	180
Massachusetts	47,930	15,530	22,190	9,600	620	60,200	15,880	30,570	13,020	830
New Hampshire	8,230	2,650	3,900	1,580	100	10,240	2,660	5,340	2,110	130
Rhode Island	7,640	2,480	3,500	1,520	130	9,470	2,530	4,760	2,010	170
Vermont	4,020	1,260	1,870	850	40	4,950	1,280	2,510	1,110	60
Middle Atlantic	261,697	85,730	121,520	50,480	3,970	330,360	85,840	169,250	69,990	5,300
New Jersey	49,900	16,310	23,470	9,560	570	62,690	16,300	32,470	13,140	780
New York	123,310	40,220	57,080	24,060	1,960	156,250	40,500	79,690	33,480	2,590
Pennsylvania	88,490	29,200	40,980	16,860	1,460	111,420	29,040	57,090	23,370	1,930
South Atlantic	314,960	101,760	148,990	60,670	3,540	395,790	100,730	206,450	83,730	4,870
Delaware	4,310	1,330	1,990	890	100	5,370	1,370	2,690	1,180	130
District of Columbia	6,650	2,130	3,050	1,330	130	8,590	2,160	4,330	1,920	180
Florida	104,590	34,610	50,130	18,980	860	132,420	33,630	70,620	26,920	1,250
Georgia	47,300	15,400	22,470	8,980	450	58,900	15,250	30,850	12,180	630
Maryland	30,920	9,660	14,350	6,510	390	38,890	9,980	19,570	8,800	540
North Carolina	45,630	14,760	21,480	8,810	580	57,000	14,560	29,600	12,070	770
South Carolina	23,070	7,270	10,870	4,600	330	28,720	7,220	14,850	6,220	440
Virginia	40,290	12,730	18,900	8,110	550	50,460	12,740	25,940	11,040	750
West Virginia	12,210	3,870	5,750	2,450	150	15,430	3,830	8,010	3,400	200
East South Central	124,750	40,770	58,480	23,800	1,610	156,010	39,890	81,130	32,820	2,160
Alabama	32,870	10,740	15,330	6,220	490	40,960	10,510	21,240	8,560	650
Kentucky	31,440	10,280	14,740	6,030	400	39,270	10,060	20,420	8,260	530
Mississippi	19,130	6,080	8,910	3,890	240	23,710	6,040	12,120	5,230	330
Tennessee	41,310	13,670	19,500	7,660	480	52,070	13,290	27,350	10,770	650
West South Central	216,440	69,390	102,540	42,290	2,390	268,720	68,710	139,850	56,870	3,280
Arkansas	20,670	6,860	9,720	3,880	220	25,630	6,730	13,360	5,250	300
Louisiana	36,070	11,630	17,070	6,930	440	45,100	11,480	23,530	9,490	600
Oklahoma	26,950	8,560	12,670	5,470	250	33,370	8,570	17,180	7,270	350
Texas	132,900	42,340	63,080	26,010	1,480	164,620	41,930	85,780	34,860	2,040
East North Central	316,840	104,360	147,680	60,500	4,300	394,060	104,230	202,720	81,370	5,760
Illinois	85,240	27,830	39,800	16,610	1,000	106,510	27,830	54,780	22,560	1,350
Indiana	41,460	13,500	19,290	7,860	800	51,740	13,410	26,680	10,590	1,060
Michigan	70,670	23,520	33,040	13,280	830	87,630	23,500	45,240	17,780	1,120
Ohio	81,570	27,040	38,030	15,450	1,060	101,300	27,020	52,160	20,700	1,420
Wisconsin	37,910	12,470	17,510	7,310	620	46,880	12,470	23,860	9,740	810
West North Central	141,360	46,230	65,720	27,700	1,710	174,980	45,850	89,710	37,150	2,280
Iowa	22,490	7,380	10,460	4,320	320	27,860	7,260	14,370	5,810	420
Kansas	19,450	6,220	9,040	3,930	260	24,090	6,180	12,300	5,260	350
Minnesota	33,540	11,180	15,730	6,350	280	41,620	11,080	21,560	8,600	380
Missouri	41,560	13,680	19,380	8,020	480	51,410	13,580	26,460	10,730	640
Nebraska	13,780	4,450	6,330	2,830	170	17,020	4,460	8,590	3,760	220
North Dakota	5,250	1,670	2,400	1,070	110	6,500	1,630	3,290	1,450	140
South Dakota	5,310	1,650	2,380	1,180	100	6,480	1,660	3,150	1,540	130
Mountain	95,640	29,070	46,070	19,430	1,070	119,130	28,990	62,580	26,060	1,490
Arizona	26,790	8,270	12,980	5,290	250	33,460	8,210	17,730	7,150	360
Colorado	22,270	7,510	11,580	4,920	260	30,320	7,560	15,780	6,620	360
Idaho	6,570	1,960	3,170	1,380	60	8,090	1,960	4,240	1,800	90
Montana	5,760	1,800	2,650	1,224	80	7,110	1,800	3,570	1,630	110
Nevada	8,710	2,770	4,260	1,600	80	10,910	2,680	5,910	2,200	120
New Mexico	8,040	2,300	3,830	1,800	110	10,040	2,340	5,140	2,400	150
Utah	11,480	3,290	5,640	2,390	160	14,270	3,270	7,590	3,190	220
Wyoming	4,020	1,170	1,960	830	60	4,930	1,160	2,620	1,070	80
Pacific	246,170	76,500	116,750	50,340	2,860	306,140	77,760	157,960	66,780	3,630
Alaska	3,210	890	1,530	730	50	3,970	920	2,030	950	70
California	182,430	56,630	86,530	37,400	1,870	227,580	57,590	117,440	49,900	2,640
Hawaii	6,030	1,770	2,870	1,320	70	7,580	1,830	3,880	1,770	100
Oregon	19,900	6,270	9,470	3,920	240	24,360	6,310	12,640	5,070	330
Washington	34,610	10,940	16,360	6,960	350	42,650	11,110	21,960	9,090	490

Estimated numbers may not add to total due to rounding.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-38. PROJECTED REQUIREMENTS FOR FULL-TIME EQUIVALENT REGISTERED NURSES ACCORDING TO CRITERIA-BASED MODEL BY GEOGRAPHIC AREA AND EDUCATIONAL PREPARATION, 2020

Geographic area	Lower Bound					Upper Bound				
	Total	Associate degree & diploma	Bacca-laureate	Master's	Doctorate	Total	Associate degree & diploma	Bacca-laureate	Master's	Doctorate
United States	3,431,830	855,330	1,754,350	796,170	25,980	4,107,550	934,600	2,170,000	965,380	37,580
New England	194,850	48,870	99,460	44,990	1,540	233,130	53,560	122,720	54,680	2,200
Connecticut	39,960	9,780	20,380	9,430	380	48,000	10,700	25,250	11,520	540
Maine	23,720	6,310	12,070	5,170	160	28,060	6,920	14,770	6,140	230
Massachusetts	91,480	22,470	47,000	21,350	660	109,930	24,640	58,190	26,160	940
New Hampshire	16,030	4,070	8,160	3,670	130	19,070	4,440	10,040	4,410	190
Rhode Island	15,670	4,170	7,860	3,480	160	18,610	4,590	9,600	4,200	230
Vermont	7,990	2,070	3,990	1,890	50	9,460	2,270	4,870	2,250	70
Middle Atlantic	480,970	117,680	249,430	109,710	4,140	580,150	128,610	310,620	134,960	5,950
New Jersey	93,440	23,020	48,250	21,510	660	112,350	25,130	59,950	26,300	960
New York	218,940	52,780	113,970	50,300	1,880	264,690	57,700	142,180	62,130	2,680
Pennsylvania	168,590	41,880	87,210	37,900	1,600	203,110	45,780	108,490	46,530	2,310
South Atlantic	585,610	139,230	303,560	138,430	4,370	706,820	146,720	379,540	150,300	6,400
Delaware	8,510	2,110	4,300	2,000	100	10,190	2,310	5,300	2,440	150
District of Columbia	11,450	2,300	6,180	2,840	130	14,210	2,520	7,900	3,620	180
Florida	203,440	46,740	108,080	47,320	1,300	247,700	50,650	136,850	58,240	1,970
Georgia	86,430	21,880	44,140	19,840	560	103,050	23,920	54,420	23,900	810
Maryland	57,030	13,670	28,810	14,080	470	68,670	14,960	35,680	17,360	690
North Carolina	82,850	20,170	42,510	19,500	660	99,600	22,010	52,940	23,700	950
South Carolina	42,660	10,440	21,700	10,130	390	51,030	11,390	26,840	12,240	560
Virginia	71,010	16,890	36,230	17,310	580	85,390	18,420	45,030	21,110	830
West Virginia	22,230	5,030	11,610	5,410	180	26,980	5,460	14,580	6,690	260
East South Central	232,740	57,060	120,170	53,710	1,810	279,980	62,270	149,720	65,350	2,620
Alabama	60,790	15,120	31,240	13,860	580	73,000	16,510	38,820	16,830	830
Kentucky	59,510	14,710	30,630	13,730	450	71,490	16,060	38,120	16,660	650
Mississippi	38,550	9,700	19,540	9,000	300	46,090	10,600	24,150	10,900	430
Tennessee	73,890	17,530	38,760	17,120	480	89,400	19,100	48,630	20,960	710
West South Central	405,520	101,380	205,740	95,450	3,010	483,960	110,760	253,950	114,860	4,380
Arkansas	41,720	10,860	21,330	9,250	290	49,750	11,880	26,350	11,100	420
Louisiana	65,570	15,970	33,710	15,350	540	78,730	17,430	41,850	18,650	800
Oklahoma	52,580	12,800	26,380	13,040	400	63,000	13,970	32,600	15,840	580
Texas	245,650	61,750	124,320	57,810	1,780	292,480	67,480	153,150	69,270	2,580
East North Central	619,740	164,360	315,020	135,860	4,490	736,050	180,090	386,170	163,390	6,410
Illinois	162,840	41,580	83,220	36,920	1,120	194,640	45,510	102,700	44,810	1,620
Indiana	79,030	20,540	40,450	17,310	730	93,940	22,460	49,600	20,850	1,030
Michigan	140,600	38,240	71,330	30,120	910	166,400	41,960	87,130	36,020	1,300
Ohio	160,240	43,110	81,320	34,750	1,060	189,890	47,250	99,520	41,610	1,510
Wisconsin	77,030	20,890	38,700	16,760	670	91,180	22,910	47,220	20,100	950
West North Central	277,130	72,600	140,380	62,100	2,050	329,190	79,580	172,280	74,450	2,920
Iowa	42,860	11,200	21,770	9,510	380	50,900	12,260	26,710	11,390	540
Kansas	37,180	9,480	18,880	8,550	270	44,200	10,390	23,200	10,240	380
Minnesota	64,880	16,930	33,090	14,410	450	77,280	18,550	40,740	17,350	640
Missouri	83,900	22,300	42,580	18,490	530	99,540	24,460	52,230	22,100	760
Nebraska	27,610	7,230	13,790	6,390	200	32,780	7,930	16,870	7,700	280
North Dakota	9,730	2,430	4,920	2,260	120	11,620	2,660	6,080	2,720	170
South Dakota	10,970	3,030	5,350	2,490	100	12,870	3,330	6,450	2,950	150
Mountain	176,720	40,560	90,050	44,700	1,440	211,870	44,050	111,770	53,960	2,210
Arizona	50,970	11,760	26,170	12,660	370	61,230	12,760	32,620	15,290	560
Colorado	45,380	10,620	23,070	11,360	330	54,420	11,570	28,560	13,800	480
Idaho	12,210	2,890	6,110	3,120	90	14,490	3,140	7,500	3,730	130
Montana	11,710	3,010	5,850	2,750	100	13,900	3,290	7,160	3,300	150
Nevada	16,630	3,690	8,750	4,060	130	20,130	3,990	11,040	4,920	190
New Mexico	13,350	2,870	6,670	3,670	150	16,040	3,110	8,250	4,470	210
Utah	19,520	4,190	9,890	5,260	190	23,380	4,520	12,270	6,310	280
Wyoming	6,970	1,530	3,540	1,820	80	8,280	1,670	4,370	2,140	210
Pacific	460,450	113,850	231,440	111,760	3,420	548,680	124,360	284,410	134,930	4,980
Alaska	5,870	1,140	2,920	1,740	80	7,110	1,240	3,640	2,120	110
California	337,930	82,100	170,630	82,730	2,470	403,920	89,620	210,370	100,320	3,620
Hawaii	10,450	2,300	5,260	2,790	90	12,550	2,500	6,500	3,410	130
Oregon	39,550	10,660	19,600	9,000	300	46,440	11,660	23,730	10,620	430
Washington	66,650	17,650	33,030	15,500	480	78,660	19,340	40,170	18,460	690

Estimated numbers may not add to total due to rounding.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

Table 10-39 PROJECTED REQUIREMENTS FOR FULL-TIME EQUIVALENT LICENSED PRACTICAL/VOCATIONAL NURSES AND NURSING AIDES ACCORDING TO CRITERIA-BASED MODEL BY GEOGRAPHIC AREA, 2000 AND 2020

Geographic area	2000				2020			
	LP/VNs		Aides		LP/VNs		Aides	
	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound	Lower bound	Upper bound
United States	291,660	289,860	1,072,220	1,347,060	—	—	1,460,020	1,841,494
New England	17,670	17,830	63,930	78,240	—	—	87,360	107,710
Connecticut	3,350	3,340	12,730	15,960	—	—	17,000	21,390
Maine	2,420	2,470	7,860	9,410	—	—	11,260	13,590
Massachusetts	8,090	8,140	29,890	36,540	—	—	40,370	49,740
New Hampshire	1,370	1,370	5,030	6,310	—	—	7,000	8,820
Rhode Island	1,650	1,700	5,690	6,680	—	—	7,900	9,480
Vermont	790	810	2,730	3,340	—	—	3,830	4,690
Middle Atlantic	38,680	38,020	146,320	182,990	—	—	195,110	245,570
New Jersey	7,360	7,230	28,150	35,480	—	—	37,970	48,170
New York	17,050	16,670	66,790	83,790	—	—	87,800	110,580
Pennsylvania	14,270	14,120	51,380	63,720	—	—	69,340	86,820
South Atlantic	39,540	37,900	160,240	207,780	—	—	216,160	283,600
Delaware	690	700	2,740	3,410	—	—	3,850	4,830
District of Columbia	500	440	2,820	3,670	—	—	3,570	4,760
Florida	9,970	8,910	44,070	59,850	—	—	60,860	84,830
Georgia	7,590	7,520	28,310	35,680	—	—	37,770	47,670
Maryland	4,810	4,840	18,440	23,150	—	—	25,100	31,500
North Carolina	6,220	6,020	24,360	31,080	—	—	32,410	41,770
South Carolina	3,240	3,170	12,810	16,420	—	—	17,280	22,260
Virginia	5,280	5,140	21,190	27,150	—	—	28,020	36,060
West Virginia	1,240	1,160	5,500	7,370	—	—	7,300	9,920
East South Central	18,190	17,680	67,480	85,830	—	—	91,560	117,620
Alabama	4,960	4,840	18,260	23,050	—	—	24,630	31,360
Kentucky	4,840	4,740	17,520	22,210	—	—	23,980	30,670
Mississippi	3,310	3,320	11,780	14,790	—	—	16,600	21,000
Tennessee	5,080	4,780	19,920	25,780	—	—	26,350	34,590
West South Central	35,300	35,060	130,510	165,470	—	—	176,770	224,650
Arkansas	3,840	3,840	13,100	16,200	—	—	18,380	22,970
Louisiana	5,160	5,040	20,310	26,140	—	—	26,910	34,780
Oklahoma	4,700	4,720	16,900	21,160	—	—	23,470	29,640
Texas	21,600	21,460	80,200	101,970	—	—	108,010	137,260
East North Central	63,580	64,510	212,610	258,380	—	—	294,430	358,170
Illinois	15,370	15,440	53,250	65,660	—	—	72,890	90,090
Indiana	7,410	7,460	26,030	32,070	—	—	35,790	44,090
Michigan	15,340	15,650	50,230	60,520	—	—	70,040	84,370
Ohio	17,010	17,310	55,800	67,330	—	—	77,630	93,710
Wisconsin	8,450	8,650	27,300	32,800	—	—	38,080	45,910
West North Central	27,640	27,940	93,370	113,360	—	—	128,530	156,640
Iowa	4,220	4,250	14,360	17,520	—	—	19,320	23,710
Kansas	3,460	3,480	12,290	15,110	—	—	16,620	20,540
Minnesota	6,320	6,350	21,690	26,370	—	—	29,410	36,000
Missouri	8,580	8,700	28,340	34,240	—	—	39,690	48,190
Nebraska	2,940	3,000	9,580	11,520	—	—	13,470	16,260
North Dakota	830	820	2,970	3,690	—	—	4,010	5,010
South Dakota	1,290	1,340	4,140	4,910	—	—	5,830	6,930
Mountain	11,060	10,650	48,530	65,600	—	—	65,910	89,120
Arizona	2,990	2,840	13,210	18,050	—	—	18,380	24,930
Colorado	3,360	3,310	13,380	17,270	—	—	18,180	23,610
Idaho	890	880	3,640	4,860	—	—	4,990	6,650
Montana	1,090	1,110	3,640	4,480	—	—	5,200	6,430
Nevada	670	580	3,410	4,860	—	—	4,730	6,930
New Mexico	730	690	3,920	5,450	—	—	4,960	6,870
Utah	990	920	5,320	7,820	—	—	6,880	10,050
Wyoming	340	320	2,010	2,810	—	—	2,590	3,650
Pacific	39,990	40,260	150,890	192,230	—	—	206,320	261,970
Alaska	320	310	1,610	2,210	—	—	2,210	3,060
California	27,900	27,930	107,660	138,070	—	—	146,570	187,440
Hawaii	660	640	2,990	4,020	—	—	4,000	5,330
Oregon	4,040	4,140	14,120	17,530	—	—	19,700	24,390
Washington	7,070	7,240	24,510	30,400	—	—	33,840	41,750

Estimated numbers may not add to total due to rounding.

SOURCE: Projections by the Division of Nursing, Bureau of Health Professions, Health Resources and Services Administration, U.S. Department of Health and Human Services, 1987.

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